RELIGION IN MIND

Religion in Mind summarizes and extends the last decade's advances in the cognitive study of religion using empirical research from psychology and anthropology to illuminate various components of religious belief, ritual, and experience. The book examines cognitive dimensions of religion within a naturalistic view of culture, while respecting the phenomenology of religion and drawing together teachers of religion, psychologists of religion, and cognitive scientists. Expert contributors focus on phenomena such as belief-fixation and transmission; attributions of agency; anthropomorphizing; counterintuitive religious representations; the well-formedness of religious rituals; links between religious representations and emotions; and the development of god concepts. The work encourages greater interdisciplinary linkages between scholars from different fields and will be of interest to researchers in anthropology, psychology, sociology, history, philosophy, and cognitive science. It also will interest more general readers in religion and science.

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RELIGION IN MIND

Cognitive Perspectives
On Religious Belief,
Ritual, and Experience

EDITED BY

JENSINE ANDRESEN

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CHAPTER 1

Introduction: towards a cognitive science of religion

Jensine Andresen

We are witnessing the birth of a new field and a new approach to understanding religion. Spurred on by two decades of advance within the field of cognitive science, scholars within many disciplines have begun to apply cognitive science concepts to a diverse array of phenomena. Although considered by some to be *sui generis*, the domains of religious experience, belief, and behavior have not been exempt from such treatment. Indeed, in the last decade, scholars from varied disciplinary arenas increasingly are willing to tackle, both individually and collaboratively, cognitive theories of religion in general and the neural bases of religion in specific. Activity has coalesced around the emergence of a coherent area of research and writing, what I refer to here as a "cognitive science of religion" following Lakoff and Johnson's (1999) recommendation that we replace the "philosophy of *x*" with the "cognitive science of *x*." This so-called cognitive science of religion is, first and foremost, a scientific and explanatory endeavor that draws on findings from the various sciences of mind. Like Lakoff and Johnson's loosening of philosophy from its analytic-cum-transcendent moorings, our endeavor is similarly "bottom up" we propose to free religion from the realm of metaphysical speculation and to anchor it instead in the empirical. At the same time, we seek to respect deeply the integrity of religious *qualia*, the phenomenology of religious experience, and the sincerity of religious belief. We therefore engage the general problems of belief and subjectivity while eschewing reductionism. Although we attempt to explain certain facets of religious experience, belief, and behavior, we do not, by any stretch of the imagination, attempt to "explain them away."

This volume has a straightforward programmatic agenda to examine the cognitive dimensions of religion and to contextualize

this discussion within a naturalistic view of culture (for more on naturalism and religion, see Griffin 2000). This general approach to cognitive science and religion, which draws heavily on developmental psychology and the anthropology of religion, sees religious representations and ritual enactments as a subset of cultural representations and actions. Many of our contributors seek to identify, within the constraints of empirical data, the cognitive dimensions of particular religious experiences and enactments. We believe that this approach offers exciting possibilities, including the potential for new interdisciplinary linkages between scholars in fields that have become increasingly specialized over the years. Furthermore, although religion's ideological, doctrinal, ritual, experiential, ethical, and social facets (Smart 1996; Watts and Williams 1988, 10) usefully may be distinguished, the contributors to this volume do not attempt rigorously to differentiate "religious experience," "religious belief," and "religious behavior," for example, since such categories obviously permit for a healthy dose of "lived" overlap (also see Beit-Hallahmi and Argyle 1997).

Our volume summarizes some of the advances made in the cognitive study of religion over the last decade, and it includes work by some of the original contributors to this field. As our volume's subtitle implies, some of our chapters focus more on the nature of experience, while others explicitly question such a focus or choose to draw attention to the formation of religious concepts. Indeed, because "religion" itself is far from monolithic, we hope our readers will conclude, as we have, that a variety of cognitive science approaches will complement one another in the emerging cognitive science of religion. Some methodologies may be more appropriate to the phenomenology of religious experience, others may lend themselves to religious ritual practices, and yet others may illuminate the mechanisms supporting religious belief and concept formation. There is no need to choose one paramount methodology over all others – the complex phenomenology of the religious simply does not recommend it.

It is our hope that these reflections on the emerging cognitive science of religion will be of interest to a broad constituency, from scholars of religion, philosophy, anthropology, psychology, sociology, and history, to scholars from cognitive science who are now branching out to formulate scientific approaches to cultural and cognitive phenomena (e.g., Pinker 1994; Diamond 1997). Although

many modes of "studying religion" have been attempted in the past — everything from the strictly historical and philological to the strictly hermeneutical and theological — it is never too late to expand our methodological repertoire. Here, we apply findings from cognitive science to the domain of religion, an area many cognitive scientists so far have eschewed.

BACKGROUND ON COGNITIVE SCIENCE

As Gardner (1985, 9) quips, cognitive science has a relatively short history but a very long past. Indeed, Singh *et al.* (1998, 21) point out that the tenth book of the ancient *Ṛgveda* enumerates various cognitive and affective activities of human consciousness and accords cognition an important role in the realization of a kind of pure consciousness. In the West, cognitive science's "relatively short history" refers to the movement from cognitivism to connectionism, onwards to more recent "enactive" models, while the "very long past" refers to historical developments relating to theories of perception and the philosophy of mind.

On the way to the current cognitive science understanding of mind as a physical symbol system with intricate representational capacities and rich computational resources, the history of the theory of perception and the "Theory of Mind (ToM)" has passed through many key transitions (see Meyering 1989; Gibson 1991). In the late nineteenth and early twentieth centuries, even the iconoclast William James (1885, 1904) speculated on the nature of cognition, characterizing it as a function of consciousness, which in turn he characterized as a function instead of as an entity. By the 1940s and 1950s, the potential sciences of mind were fragmented into disparate disciplines including neurology, psychoanalysis, and behaviorist experimental psychology. Concurrent with a movement in the social sciences away from behaviorism and towards the study of cognition, the modern discipline of cognitive science emerged in the 1950s with the advent of modern digital computers (Varela *et al.* 1996 [1991], xvi).

Prior to 1956, most theory in linguistics was behaviorist in approach, but Noam Chomsky's *Syntactic Structures* (1957) introduced the idea that the "grammar" speakers must learn in order to speak a language is a mental object not describable, or accountable in behaviorist stimulus–response terms (see Miller and Gazzaniga 1984, 4–5). Chomsky had written scathing criticisms of B. F. Skinner and

the behaviorist approach to human language and thought, favoring instead a strict Cartesian formalism based on the idea that language, which derives from logic, instantiates itself in the human brain. In his Woodbridge Lectures of 1968, Piaget (1970) criticized Chomsky, saying, approximately thirty years before Lakoff and Johnson (1999) underline the same point (see also Huck and Godsmith 1995), that formalism is not enough. Although Piaget did admit some "correspondence" between formalization and psychological formation, he stressed that philosophers need to take empirical psychology seriously (Benson 2000). A few years later, in 1975, Chomsky and Piaget debated with one another at Abbaye De Royaumont, near Paris (Piattelli-Palmarini 1980). The two disagreed on the status of cognitive development Chomsky argued that developmental cognitive matters are not relevant to the internal formal structuring of thought, while Piaget (and much recent neurological research) claimed that they are (Benson 2000; also see Reich 1993; Wulff 1993; Fowler 1993).

According to Chomsky (1980), domain-specific cognition refers to the idea that humans are endowed with a number of innate systems of knowledge, such as knowledge of language, knowledge of physical objects, and knowledge of space. The term "domain" refers to a concatenation of phenomena involving the entities recognized by the theory, and cognitive domains are seen to pick out a set of entities in the world and to process privileged sorts of information about these entities. During the 1960s, Chomsky used his work in theoretical linguistics to challenge the Renaissance picture of mind as a blank slate upon which the environment leaves its traces and against dominant notions at the time that language was environmentally determined. He argued instead for an innate linguistic module in the brain, claiming that the brain was genetically programmed to contain a specification of an abstract system of syntactic rules that are brought to bear on the incoming acoustic flux (McGinn 1998, 34 35; Chomsky 1997a and b; Agassi 1997). Now, one finds Karmiloff-Smith's (1992) theory of developmental change straddling the gulf separating Piaget's (1954 [1937], 1971 [1967], 1972 [1970]) constructivism and both Chomsky's and Fodor's (1981) nativism.

By the early 1960s, what Searle (1992) refers to as the strong "cognitivist" program had developed in artificial intelligence (AI) circles. This program sports a cognitivist model of mind, a computational model in which cognition is postulated to be information

processing as symbolic computation, i.e., the rule-based manipulation of symbols. According to this view, nearly all aspects of human cognition, including perception, memory, reason, knowledge, decision-making, learning, language, and in some cases, consciousness and emotions, are examined in terms of information processing (Hardcastle 1996, 5–6; Putnam 1960; Young 1987, 26–33; Thagard 1988; Black 1991; Churchland and Sejnowski 1992). In contrast to this strong model, with its requisite strong philosophical formulations, a softer perspective sees cognition as helpfully modeled by symbolic computation. Indeed, most current cognitivist research follows this softer view (Wildman 1999).

Articulating a cognitivist theory, Pinker (1997) generalizes from a special theory relating to language (Pinker 1994) to speculate about the nature of the mind. Pinker's approach has been dubbed "Cognitive Darwinism" (McGinn 1998, 34–35), since it synthesizes neo-Darwinian, gene-based natural selection theory and a computational model of mind (also see Depew and Weber 1994). Pinker's model delineates four elements central: computationalism; modularity; innateness; and adaptationism. "Computationalism," as we have noted, construes the mind as a neural computer that processes information on the basis of a symbolic code. The mind performs operations on symbol strings in order to solve problems, such as forming accurate representations of the environment. "Modularity" refers to the idea that the mind is composed of a collection of relatively independent, special-purpose modules. These distinct, cognitive programs are believed to perform particular functions, such as language and vision. Each module has its own location in cognitive space, its own principles, and its own domain of expertise. Still, despite modularity, the degree of coordination of mental activity is open to question (see Fodor 1983, 1994). Third in Pinker's line-up, "innateness," refers to the notion that the mind's computational modules are genetically fixed. And "adaptationism" refers to the idea that the mind's innate computational modules are biologically functional, meaning that they have evolved by natural selection and that their functions are adaptive to the conditions in which they evolved (for another example of a theory combining modularity and adaptationism, see Sperber 1994).

In the late 1970s, the "connectionist" approach in cognitive science began to characterize the nature of human cognition as networks that give rise to typical and regular dynamical behavior

instead of as a system of rules that manipulates symbols (Rumelhart 1989; for a feminist/psychoanalytic review of connectionist theories, see Wilson 1998). Humberto R. Maturana bears much of the credit for inaugurating the interdisciplinary, constructivist endeavor, which brought together biologists, ethologists, philosophers, and psychologists to investigate questions relating to cognition (Foerst 1998, 95; Maturana and Varela 1987; Watzlawick 1984). Merleau-Ponty (1962) also contributed to the connectionist revolution by introducing phenomenology into the nascent field of cognitive science in order to address more directly questions relating to the world of lived, human experience. In contrast to earlier information-processing metaphors, which emphasized input-output processing, Merleau-Ponty championed emergent, interactive, and holistic perspectives, focusing especially on transformations of consciousness induced by ritual activities such as yogic meditation (also see Wrathall and Kelly 1996).

Arising within the context of cross-disciplinary scientific naming of "emergent" properties, connectionism now finds itself reinvigorated by the study of complexity. The connectionist approach emphasizes the emergence of high-level structures or entities from the interaction of lower-level terms. In addition to characterizing cognition as the emergence of global states in a network of simple components, connectionism also holds that cognition works through local rules for individual operation and through rules for changes in the connectivity among the elements. Utilizing concepts such as "self-organization," connectionism (also called the "associationist" or "network dynamical" approach) hypothesizes that cognition "emerges" from the interaction of the structures and processes of our physiological systems, and it tentatively applies this proposition even to slippery phenomena such as "consciousness" (Varela *et al.* 1996 [1991], 87–99; Horst 1996). In the dominant forms of computationalism and connectionism, cognitive processes and their roles in cognitive behavior are viewed in terms of representations that correspond to properties and events in the world. Indeed, it is just this soup from which Sperber fashions his theories of "mental representations."

Marked by the publication of *The Embodied Mind: Cognitive Science and Human Experience* (1996 [1991]) by Varela, Thompson, and Rosch, the "enactionist" paradigm in cognitive science made its debut in the early 1990s, bringing Husserlian-style phenomenology together

with Madhyamaka Buddhist philosophy and the work of Merleau-Ponty. Enactionism questions the relevance of representations *per se* while acknowledging the importance of dynamical mechanisms and emergence. According to the enactionist view, cognition is embodied action — the enactive activity of situated agents who create regular interdependencies with their surroundings. Indeed, this view has been influential in the development of Lakoff and Johnson's (1999) "embodied realism." Whereas the realism of cognitivism and connectionism maintains that cognition is related primarily to problem-solving, Varela *et al.* (1996 [1991], 173–174) describe the phenomenon of "perceptually-guided action," which contributes to the enactment of the world instead of being simply embedded within and constrained by the surrounding world. Indeed, Clark (1993, 1997) and Hendriks-Jansen (1996) articulate similarly complex views of the interactive emergence of cognition and the world, and Thelen and Smith (1994) bring dynamic systems theory together with research in neuroscience and neural development to forge a new theory of the development of cognition and action.

THE STUDY OF RELIGION

In the late nineteenth century, Edwin Starbuck, a pupil of the first professor of psychology at Harvard, William James (the brother of Henry James), undertook research inaugurating the so-called scientific study of religious experience. Starbuck (1899) was the first person to construct a questionnaire that inquired into people's experience of religious conversion, an important element of Protestant New England culture with its Puritan and Pietist heritage (Hay 1990). In 1901, William James traveled to Scotland to deliver the Gifford Lectures of 1901 and 1902 at Edinburgh University. These lectures subsequently were published in 1902 under the title *The Varieties of Religious Experience: A Study in Human Nature.* James drew heavily on examples of contemporary conversion experiences provided by his student, Starbuck (Hay 1990, 4), and, interestingly, he entitled his first chapter in the book "Religion and Neurology." Although prior to James' usage, the term "religious experience" suggested feelings and emotions deliberately cultivated in certain Christian communities and regarded as evidence of divine grace, James used the term more inclusively. And, like Starbuck, James approached testaments of individual religious experience according

to the systematic norms of the "objective science" current in his day (Moore 1938, 1). James was convinced of the futility of all attempts to capture the essence of religion in a simple definition, which led him to favor an empirical approach to religion. Both a psychologist and philosopher, James (1902, 28–30) distinguished "institutional religion" and "personal religion," claiming that "personal religion will prove itself more fundamental than either theology or ecclesiasticism." He also contrasted the "original experiences" of the founders of religious sects with the "second-hand" religious life of followers.

The foundations of James' theory of experience are laid out in his *Principles of Psychology* (1890), in which he advanced two distinct theses. First, James reinterpreted introspective psychology by denying that sensations, images, and ideas are discrete, replacing them instead with a "stream of consciousness" (foreshadowing his radical empiricism and realism); and, second, he advanced a biological thesis by proposing criteria for the existence of mind (foreshadowing his anti-intellectualism and pragmatism) (Dewey 1925, 369–370; Moore 1938, 8, 19). James was himself particularly interested in the biological mechanisms associated with human psychology (Singh *et al.* 1998, 25), and he distinguished two kinds of knowledge, "knowledge-by-acquaintance" (direct sensory contact, as when we taste a fruit); and "knowledge-about" (conception or representation, as when we name a fruit). He believed that the former, being gained in immediate experience, was more fundamental, while the latter was the product of the reflective activity of mind operating on the material supplied by immediate experience (James 1890, vol. 1, 221, as cited in Moore 1938, 15). Also writing around the time of William James, Borden Parker Bowne (1908) and his "personalist" movement offered a proto-cognitive approach to religious experience by considering the relationship between mental states and experience of the divine. Precursors to these ideas also exist in Bowne's (1882, 1897) early works.

Freud (1918, 1928, 1930, 1939, 1956 [1928]) launched the "psychoanalytic" investigation of religious experience, comparing religious and compulsive behavior (1989 [1907]) and claiming that both magic and religion are projections of neurotic wish-fulfillment and psychotic delusions (also see Stark and Bainbridge 1987, 159; Philp 1956; Eysenck and Wilson 1973; Rainey 1975). Although Freud himself saw the investigation of religious experience to be but one dimension in an overall science of mind (Kitcher 1992), his pioneering work

inspired a range of researchers interested in the psychoanalytic dimensions of religion (e.g., Fromm 1950; Zilboorg 1962; Homans 1970; Beit-Hallahmi 1978; Rizzuto 1979; Handelman 1981, 1985; Meissner 1984; Smith 1990). In the last decade or so, work correlating religion with styles of attachment has become increasingly popular. For example, Kirkpatrick and Shaver (1990) claim that findings concerning images of God, conversion, and prayer can be integrated conceptually into a framework based on attachment theory, while Kirkpatrick (1997) examines religious belief and behavior in relationship to attachment style using longitudinal data (also see St. Clair 1994).

Writing around the time of Freud but from a different perspective, Rudolf Otto (1950 [1923]) adopted Schleiermacher's definition of religion as the "feeling of absolute dependence." Otto's contention that "If there be any single domain of human experience that, presents us with something unmistakably specific and unique, peculiar to itself, assuredly it is that of the religious life" (1950 [1923], 4), stands in marked contrast to James' questioning of whether or not religious experience contains anything of a psychologically specific character (Moore 1938, 76). Henri Bergson (1935 [1932]) also set out to develop a theory of religious experience, by examining the nature and psychological roots of religion and the related sphere of morality. According to Bergson, religious experience is rooted in human striving, and its mystical and imaginative features are constrained by social context.

Gerardus van der Leeuw (1938 [1933]) and Mircea Eliade (1959) have been influential in drawing attention to the so-called *sui generis* nature of the sacred, in the aftermath of what some believed to be the alarming attempt by psychoanalysis and science to explain religion away. Like Otto, van der Leeuw and Eliade both approached religion phenomenologically by attending to the phenomena of religious experience while attempting to bracket out cultural biases in order to bring into focus previously neglected aspects of the experience. Like Otto, van der Leeuw, who was influenced by Kierkegaard, Nietzsche, and Husserl, attended to the nonrational aspects of the experience of the sacred, emphasizing especially the characteristics of power and dread. Otto and van der Leeuw, also influenced Eliade, who studied the phenomenology of religious experience in both its rational and nonrational manifestations, and systematically articulated the rational and archetypal

structure of the sacred (Smith 1995, 42–47). Eliade's predecessor at the University of Chicago, Joachim Wach (1958), left us an early working definition of religious experience, while other scholars focused on the epistemology of religion (e.g., Bouquet 1968) and its relationship to theology (e.g., Cargas and Lee 1976). Naturally, many scholars also examine religious experience in the context of particular religious traditions (e.g., Antes 1992; Smart 1998).

Over the years, scholars of religion have debated whether it is appropriate to "explain" religion rather than merely to "interpret" it. Although primarily "biological" accounts of religion still remain suspect in certain circles (e.g., Rolston 1999 a and b), explanatory models of religion, which never completely went out of vogue in the psychology and sociology of religion, have appeared within the last decade in religious studies discussions (e.g., Sullivan 1995, 2000; Bagger 1999; Andresen 1999). Biological accounts of the adaptive value of religion and religious experience (e.g., Reynolds 1976; Reynolds and Tanner 1983; Jones and Reynolds 1995; Hinde 1997), or closely related accounts of the "social ecology" of religion (e.g., Reynolds and Tanner 1995), require theorists to consider how cognition and biology are interrelated.

In contrast to explanatory accounts, claims concerning the *sui generis* nature of the sacred served as inspiration for the formulation and application of "interpretive" strategies in religious studies (e.g., Beebe 1999; Mullin and Richey 1994; Fulop and Raboteau 1997; Spolsky 1993). Such claims also inspire an interpretive approach to anthropology and ethnology, including the anthropology of religion (e.g., Geertz 1973, 1983; Moore 1997; Bohannan and Glazer 1988 [1973]). Interpretive approaches to religion mitigate concerns about reductionism, which also exist in the psychology of religion. Stating that a neuropsychological approach is particularly appropriate when one is dealing with practices that affect bodily states, Wulff (1997, 112), for example, wonders whether referral to brain and other bodily processes is always the most illuminative course of action.

In fact, the attempt to formulate reasonable explanations for religion and religious experience need not be threatening – as McNamara (1999a) observes,

> Even though language for experience can be decomposed into modules that are ultimately non-linguistic, that does not mean that language does not exist! It is the same with every other domain of cognition . . . Reductionist programs of research in the sciences will not cause the

phenomena undergoing reduction to disappear they simply will be related to everything else that has been studied."

Indeed, it is truly unwise to conflate "explanation" with "reduction." The careful collection of data will further our understanding of religion, especially when we do not project finality onto the data we happen to collect. By deepening our awareness of our complex situatedness in a value-permeated realm of enaction, we need not choose between explanation and interpretation. And, of course, it still remains to be determined what constitutes an actual "explanation" complex phenomena must be accounted for at several, complementary levels (Lakoff and Johnson 1999), including both the physiological and the symbolic (Simon 1992).

In contrast to some historians of religion and comparative religionists, many scholars in the psychology of religion (e.g., Tisdale 1980; Wulff 1997) have favored explanatory endeavors. Beit-Hallahmi and Argyle (1997, 10 33) survey different explanatory categories and research hypotheses in the psychology of religion, using three broad headings: "Origin Hypotheses" (which attempt to explain the psychological sources of religion); "Maintenance Hypotheses" (which attempt to explain why certain individuals or societies hold particular belief systems); and "Consequence Hypotheses" (which concern the effects of religious behavior for either individuals or social groups). The heading "Origin Hypotheses," for example, includes the sub-categories of "cognitive need explanations," "cognitive styles: evolutionary optimism," "cognitive styles: religion as art," "adjustment to anxiety and insecurity," "fear of death," "the effects of early childhood," "projection and religious beliefs," "the super-ego projection theory and relief of guilt," and "sexual motivation" (also see McCallister 1995). The authors summarize a number of theories in each of these sub-categories. For example, under "cognitive need explanations" (Beit-Hallahmi and Argyle 1997, 12–13), we find Gilbert's (1991) contention that humans prefer credulity to doubt, Fiske and Taylor's (1991) and Markus and Zajonc's (1985) view that there exists a cognitive tendency to organize the world according to simple cognitive structures, Kruglanski's (1989) description of the human need for cognitive closure as the desire for any answer on some topic as opposed to confusion and ambiguity, and Koestler's (1940) contention that religion seeks to make sense of suffering. (For more on the psychology of religion, see Pargament 1997.)

Moving from the psychology of religion to the "social psychology" of religion, we find Batson and Ventis' (1982, 6–7) discussion of the three features of religious experience: uniqueness (difference from everyday experience); complexity (involvement of a complex array of psychological categories, including emotions, beliefs, attitudes, values, behaviors, and social environments); and diversity (an immense range of experience, with divinity itself failing as a common denominator across all traditions). More recently, Batson *et al.* (1993) present a three-dimensional model for assessing personal religion as a means, end, and quest. This model includes much empirical data on the relation between personal religion and mental health, and it extends prior analysis of the social consequences of personal religion to an examination of the relationship between personal religion and intolerance, prejudice, and bigotry. Additionally, it examines the relationship between personal religion and a concern for, and helping of, others in need (Batson *et al.* 1993, vii). Other researchers focus on the sociological dimensions of religion (e.g., Greeley 1973; Durkheim 1912; Park 1915; Weber 1963; Whitley 1964; Schneider 1964; Stark 1966–1970; Berger 1967, 1990; Greeley 1973, 1975; MacDonald 1994, 1995), while Stark and Bainbridge (1987) propose a "theory of religion," a mere 225 years after the printing of Rev. John Orr's (1762) *The Theory of Religion, in Its Absolute Internal State.*

Overlapping but not coterminous with the study of religious experience, the study of mystical experience (e.g., Smart 1967; Ellwood 1999 [1980]) occupies scholars concerned with the most interior and epiphanic spaces of the human life. As examples of scholarship in this area, Gellhorn and Kiely (1972) describe the neurophysiology of mystical states, Hood (1976) explores mystical experience and its correlation to church participation, and Muray (1996) assesses Bernard E. Meland's "mystical naturalism" and its connection to ecological responsibility. As with religious experience in general, some authors attempt to typologize mystical experiences, though many of these typologies appear somewhat arbitrary, based on limited observation, e.g., of a clinical population or of a particular cultural group. Based on his clinical observations, d'Aquili (1982), for example, typologizes eight "primary senses of reality" in the phenomenology of mystical states, including the state of "cosmic consciousness" and a ninth, "theoretical" state of AUB (Absolute Unitary Being).

One question occupying scholars of mysticism is whether or not the quality of what is experienced (perennialist position) or the mode of interpretation (constructivist position) characterizes an experience as "religious." Indeed, this question also applies to the study of religion. Contemporary representatives of perennialism, a.k.a. "decontextualists," "deconstructivists," and "postconstructivists," claim that while the texts and statements of mystics may be shaped by the background of everyday experiences, their mystical experiences are not necessarily conditioned by the same sorts of processes (Forman 1998, 6). Perennialists, who often draw on the work of James (1902) and Otto (1950 [1923]), and who support the notion of unmediated experience (e.g., Cousins 1986; King 1988), argue for qualitative definitions of religious experience, such that numinous, peak, and transcendent experience are termed "religious" (Forman 1990, 1994). Other perennialists (e.g., Huxley 1963 [1956], 1972a and b; Smith 1976) interpret religious experience metaphysically, claiming that such experiences are caused by contact between the human soul, other beings, and God (see Bagger 1999, 90–108 for a helpful critique of the perennialist position).

In contrast to the perennialist approach, constructivists (e.g., Katz 1978; Proudfoot 1985) claim that the mode of interpretation significantly determines which experiences are characterized as "religious." Constructivists, therefore, generally support the notion of mediated experience (e.g., Zaehner 1957; Smart 1965, 1978; Bharati 1976; Streng 1976, 1978; Hick 1980; Moore 1987; Bermudez 1995). Watts (1999, 328) helpfully mediates between the perennialist and constructivist positions by suggesting that we "see the term 'religious experience' as covering a variety of different kinds of experience, with family resemblances among them." According to Watts, such an approach permits scholars to avoid discussions of whether religious experience should be defined in terms of their phenomenological qualities or with reference to interpretive frameworks.

Other accounts of religion draw on "psychobiology," a term used often in the 1980s to describe the biological basis of psychological factors and to describe questions about the nature of mental experiences and their relationship to bodily experiences (e.g., Bunge 1980; Wratchford 1983; Wagman 1998). Psychobiological theories emphasize the physiological states connected with religious experiences, for example, the fact that ecstatic singing and dancing some-

times are identified as experiential triggers (Beit-Hallahmi and Argyle 1997, 81–84; Greeley 1975; Spilka *et al.* 1985; Hood 1995; Spilka and McIntosh 1997). Hayden (1987), for example, claims that the formation of inter-band alliances was critical in times of severe resource stress, and that ecstatic states induced by ritualized procedures and shared by members of different bands were the mechanisms whereby strong emotional bonds were created and maintained between bands. Distress also may contribute to religious experiences (though Ross 1990 finds the opposite), since religious conversions often occur when people are in a state of conflict or anxiety (see Spellman *et al.* 1971).

While studies focusing on religious experience often typologize states of inner experience, sometimes according to the subjective reports of adherents and practitioners, studies of religious behavior (e.g., Argyle 1959) are more likely to focus on particular, easily demarcated aspects of behavior (see Rachlin 1994 for more on behavior and the mind in general). For example, both interpretive and explanatory scholarly analyses often focus on ritual (e.g., van Gennep 1960; Turner 1969; Grimes 1976, 1985, 1990, 1993, 1995a and b; Tambiah 1981, 1985; Bell 1992, 1997). Of course, participants in religious rituals frequently report significant religious experiences, so it would be unwise to draw too firm a line between the two domains.

The study of ritual suggests an interesting ideal not usually broached in other discussions of religion, namely a possible continuum between the ritual of various animals and the religious ritual of humans. Early in the twentieth century, Sir Julian Huxley (1968 [1914], cited in Moore *et al.* 1983, 211) used the term "ritual" to refer to the behavior of the great crested grebe, and in 1965, he organized a discussion of "ritualization of behavior in animals and man" for the Royal Society. Much anthropological scholarship has focused on the distinction between "ritualization" and "ritual" (e.g., Huxley 1966; Leach 1966), with dimensions of ritualization being addressed by reference to Paul MacLean's (1973a and b, 1975, 1976, 1990) model of the triune brain (reptilian, palaeo-mammalian, and neo-mammalian). Turner (1983, 225), for example, is intrigued by MacLean's (1973b, 1975, 1976, 1982) work, including the latter's hypothesis concerning the anatomical relations of the frontal lobes to the limbic system.

Examination of continuity between animal and human modes of

ritualization brings us face to face with discussions on the origins of culture (e.g., Dupuy and Varela 1992; Girard 1992; also see Chapple 1970) and of religion (McClenon 1997; Hefner 1993; for a review of Hefner, see d'Aquili 1994). Data from animal psychology are overturning the notion that humans are unique among species in having minds (Campbell 1994), and Allen and Bekoff (1997, x xi) argue that a thoroughly naturalistic approach to understanding the nature and evolution of mind (and, by extension, culture) must consider the evolution and biological continuity of human and nonhuman mentality.

Whereas religion traditionally has been demarcated as the unique domain of humans, nonhuman primates were probably the first ritual specialists. For example, ethologists such as Lorenz (1966) argue that human evolutionary inheritance may include rituals that reduce aggression and produce awe and subordination, which often are observed among animals. In fact, many a continuum exists between repetitive sequences of animal gesticulation, conventional forms of human ritual engagement, and, at the other extreme, human behavior of a more pathological nature, such as extreme forms of obsessive-compulsive disorder. Future discussion of a possible continuum between animal ritualization and human ritual will benefit from evidence that nonhuman primates indeed possess brain structures that permit the use of the symbolic capacity (e.g., Savage-Rumbaugh and Lewin 1994; Savage-Rumbaugh *et al.* 1993, 1998). Additionally, religion scholars need to take seriously the implications of Gibson's (1993, 11 13) work demonstrating connections between tool-making, symbolism, syntax, culture, and other capacities for theories concerning the development of religious ceremonial rituals in human primates.

Moving from ritual to belief, the attempt to understand the origins of, and basis for, human processes of belief acquisition leads theorists working at the interface of religion and biology (see Kamppinen 1999) to inquire into evolutionary adaptation, especially as it relates to language. Extending his earlier work on language (1994) and the workings of the mind (1997), Pinker (1998) formulates an adaptationist perspective on religious belief in which religion is seen to be a by-product (i.e., spandrel, or exaptation) of adaptation (also see Barkow *et al.* 1992). Whereas an adaptation exists in the environment now because of its favorable effect on the organism's ancestors, a by-product exists as a consequence of an adaptation. Pinker believes

that religious belief is "a by-product of other adaptations in the minds of many," and he claims it is segregated from mundane reasoning in the realm of everyday cause and effect.

Noting that the Theory of Mind Module (ToMM), perhaps localizable to the ventromedial frontal cortex, enables us to impute minds and motives to others, Pinker (1998) claims that belief in religious spirits, gods, etc. is an example of this intuitive psychology run amuck. Since we easily can infer the existence of others' minds, inferring minds without bodies (e.g., God), or with ethereal bodies (e.g., angels), does not stretch us far, says Pinker. Despite its intriguing points, Pinker's theory is one example of a theory that attempts to explain too much. "Religion" is no monolithic beast, shaped and festooned to fit the contours of specific historical and cultural niches. Many languages do not even possess an easy translation for our term "religion," which should give us pause. Indeed, the study of religion continues to suffer when scholars attribute, or project, some degree of ontological reality to the realm of the so-called "religious," simply because, intuitively, the phenomena we place inside our Western linguistic category *seem* to cohere together. Although the acts of reciting the rosary, praying, taking communion, singing hymns, and forming beliefs relating to an entity we may designate as "God," all may seem to fit together under the rubric of "religion," each one of these activities designates a particular behavior that, potentially, could be accounted for by different cognitive and biological explanations. Still, some common underlying physiological and/or cognitive qualities may characterize phenomena we call "religious," and historical, sociological, and political factors also may have some bearing on why we group certain beliefs, experiences, and behaviors together under the umbrella term "religion." *Why* we intuitively group these behaviors together may have quite a bit to do with how we *feel* when we participate in these activities, a finding that, if substantiated, will help us bridge studies of religious behavior and religious experience.

APPLYING "COGNITION AND CULTURE" METHODOLOGY TO THE STUDY OF RELIGION

The broader framework of "cognition and culture" studies (e.g., Shore 1996; Brothers 1997) contextualizes the Chapters in this volume. Cognition and culture studies work together with the

psychology of religion to provide an empirical basis for a cognitive study of religion based on the systematic testing of hypotheses concerning various components of religious experience, belief, and behavior.

Many of this volume's contributors draw particularly on the work of Dan Sperber and Pascal Boyer. In *Rethinking Symbolism* (1975), Sperber furthers a cognitive understanding of religion by supplanting a traditional "semiological" view of symbolism. Later, Sperber (1985, 1990, 1996) unites cognitivism and adaptationism in his examination of mental representations, using epidemiological models of population-scale macro-phenomena such as epidemics to describe the transmission and eventual distribution of cultural representations, including religious ones. Sperber presents a naturalistic approach to culture based on an "epidemiology of representations," crediting the French sociologist Gabriel Tarde (1895) with the first attempt to develop a scientific cultural epidemiology (also see Perner 1991). Sperber's epidemiology of representations is a pastiche of disparate models from population genetics, ecology, and social psychology, all of which seek to explain macro events as the aggregation of individual events caused by micro processes. Sperber himself argues that ideas can be passed from one person to the next; that culture is composed of contagious ideas and also of productions (writings, artwork, tools, etc.) that spread ideas; and that one can explain culture by explaining why and how some ideas spread more effectively than others. In his epidemiological approach, individual mental representations are transformed by the communicator into public representations, and they are then re-transformed by the audience into mental representations. Mental representations that are repeated and spread throughout a group become cultural representations. Finally, the propagation of mental representations produces causal chains composed of interactions between individuals' cognitive processes and their shared environment.

Sperber (1996, 70 92) claims that, although enduring religious beliefs spring from everyday experience, they are evocative because they diverge from common experience in startling ways. Whereas everyday knowledge is rigidly constrained and must conform to stored knowledge, other kinds of mental representations arise from our cognitive ability to form "meta-representations" (representations of our own representations) such as religious thought. Humans are dispositionally inclined to use meta-representations to expand know-

ledge, Sperber argues, but this same meta-ability also may render us susceptible to irrational beliefs. Mysterious beliefs that are more evocative, and, therefore, more memorable, will be culturally successful "relevant mysteries" will persist, not because of a human propensity for them, but because of human, cognitive susceptibility to their addictiveness.

Sperber (1996, 100 150) identifies many shortcomings in the use of selectionist models to explain the persistence of religious beliefs and practices, and he also defends the idea that thought processes are modular (i.e., the domain specificity of naïve physics, which governs our notions regarding the movement of inert solid objects; of naïve biology, which governs ideas concerning the appearances, essences, parts, etc. of organisms; and of naïve psychology, which governs our notions of people's actions). And to explain the co-existence of modularity alongside cultural diversity, Sperber postulates a brain with input modules, first-order conceptual modules (with intuitive beliefs), and a second-order meta-representational module (with reflective beliefs).

While the true strength of Sperber's work is its theoretical coherence, one often wishes it were founded upon firmer empirical ground. For example, Sperber (1998a) proposes a model of religious experience and transmission involving a series of theoretical entities he dubs "Cognitive Causal Chains" (CCCs) evolutionary, causal processes that describe interactions between organisms, their environments, and organisms' minds. These CCCs bring together content (the link from a belief and a state of affairs) and the causal (the link back from a specific state of affairs to perceptions and beliefs). If it were possible to operationalize these CCCs to facilitate predictive empirical testing, Sperber's theories potentially could be confirmed.

Reflecting on the puzzle posed by the existence of stable components within a population, and recognizing that some thinkers have attempted to model cultural transmission using a general social science model (e.g., Weingart *et al.* 1997), Sperber (1998b) observes that neither cognitive nor communicative processes explain stable replication. Instead, these processes involve reconstruction, often with the objective of "getting it" (i.e., understanding the gist of the message) in a way that is personally useful. To understand why representations stabilize in culture, Sperber argues that the mind seeks certain types of information and organizes it in certain ways. Modules in the mind necessitate certain input conditions, which

explains why many cultural productions, e.g., masks, are designed to elicit certain reactions from the facial recognition device. Other cognitive and ecological factors also may cause cultural forms to stabilize over time. For example, it may be more difficult for someone *not* to perform a religious ritual, since this may start a chain of representations about what may happen negatively as a result of not enacting the proper ritual sequence. How Sperber, or others following in his footsteps, choose to concretize notions such as "stability" will be crucial to demonstrating the ideas, value and range of applicability. Additionally, one will need to decide whether notions such as "similarity" and "stabilization" refer to comparisons within a single category (e.g., varying widths of men's neckties), or to changes between categories believed to be close to one another (e.g., fashion transitions from neckties to cravats).

Sperber (1998b) suggests that historians of religion reflect on factors that influence the success of one textual variation versus the failure of others, and that they also consider the cognitive costs and benefits to individuals of adopting certain textual innovations (see Rubin 1995). Certain religious narratives and rituals evolve towards easily remembered forms, thus reducing cognitive load, though it is still unclear why this may be so. Do certain elements internal to the structure of rituals or narratives facilitate the collapse of these manifestations to simpler forms? Sperber does mention that saturation with certain types of representations within a religious system opens space for new innovations that are somewhat similar. But these representations also must be "at the right distance," i.e., sufficiently novel, but not too far or too close from the original to be considered irrelevant.

Many of the chapters in this volume also presuppose a familiarity with the work of Pascal Boyer. In the area of cognition and culture studies, Boyer's name is readily associated with the phrase "counter-intuitive ontologies," which he believes characterize religious representations. While Sperber emphasizes disciplines such as epidemiology, Boyer considers evolutionary theory, especially the phenomena of selection and cultural transmission. Boyer (1993b, 1994, 1996a [1995], 1996b) claims that religious symbolism and representations are cognitively constrained by universal properties of the human mind-brain while symbolists in cultural anthropology ignore cognitive constraints, neo-intellectualists and structuralists tend to postulate them in an *ad hoc* manner. Boyer also claims that

subjects apply conceptual structures and processes derived from their understanding of other types of contexts to religious situations, such that general patterns of cognitive development inform children's understanding of symbolic hierarchies and constrain the type of abstract religious models they construct (also see Toren 1993; Barrett 2000).

Boyer (1993a, 145; 1994, 104–107) does not believe that religious symbolism is domain specific, since religious representations in a particular group are not all acquired and represented in the same way. Nevertheless, like Sperber, Boyer accepts the domain specificity of a naïve physics, a naïve biology, and a naïve psychology, and he hypothesizes that these three domains are relevant to religious assumptions. Cognitive factors also constrain the performance and representation of ritual action, says Boyer (1993a, 145–146), who observes that ritual is different from everyday activity in its "apartness" (it is intuitively distinct from everyday existence, both subjectively in terms of people's intuition, and objectively in terms of ritual space) and in its "scriptedness" (ritual scripts differ from everyday scripts, in the relations between goals and actions and in the processes underlying the identification of ritual action).

Boyer accounts for the acquisition of beliefs and concepts through the interactive processes of persuasion, memorization, and transmission of items of knowledge. Other scholars also address belief acquisition, for example Ozorak (1989), who conducts an empirical study of the social and cognitive influences on the development of religious beliefs and commitment in adolescence. Vergote (1985) provides a nuanced exposition of the conflict between belief and unbelief in the psychology of religion, and the contributors to Fraser and Gaskell's (1990) edited volume examine widespread belief systematically, theoretically, and empirically. Lamberts and Shanks (1997) provide an account of knowledge and concept learning, Fiez and Tranel (1997) offer a specific explanation for the retrieval of lexical and conceptual knowledge for actions, and Nelson and Narens (1990) examine developmental changes during childhood in the context of interactions between cognitive monitoring and control. Finally, the contributors to Mazzoni and Nelson's (1998) edited volume also examine cognitive monitoring and control processes, including the phenomenon of "metacognition."

On the topic of belief acquisition, Boyer (1994) believes that people have religious ideas because others in their environment had

them before, and because the individual needs to have substantial prior hypotheses in order to pick up richly structured, available information. He suggests that to understand the recurrent features of religious representations found in many cultures, we consult the empirical findings of experimental psychology, which show that many universal, richly structured, early-developed, conceptual principles organize our understandings of particular aspects of natural and social environments. Boyer further contends that the content and organization of religious ideas depend upon noncultural properties of the human mind-brain, and, despite socialization, that these are perceived intuitively as unnatural by human subjects in fact, this subjective unnaturalness contributes to their transmission. Despite the cross-cultural recurrence of religious themes, however, Boyer believes that the vague notion of supernatural entities and agency is the only substantive universal we find in religious ideology. This echoes Stark and Bainbridge's (1987, 40, 81) earlier restriction of the definition of religion to a general compensator system that rests on supernatural assumptions, in keeping with a long tradition stretching back to Tylor (1871).

When explaining the recurrence of features in a population of organisms, Boyer (1994, 9 38) refers both to generative models, which posit an underlying mechanism that will provide a sufficient explanation for the occurrence of the features, and selective models, which account for recurrent features by positing a set of underlying mechanisms that are necessary yet insufficient to produce the recurrence. For example, Sperber's "epidemiology of beliefs" is an example of a selective model, one focusing on transmission mechanisms as the main cause of recurrence. Boyer (forthcoming) himself favors a selectionist model to explain recurrent trends, one in which selective retention of variants explains observed patterns. Boyer (1994) contends that relevant selection criteria in the case of religion involve equilibrium between intuitive and counterintuitive concepts about agents and entities, and he argues that religious representations typically comprise claims that violate people's ideas concerning what is natural. He hypothesizes further that people have some cognitive means of sorting out events and states that violate their intuitive expectations.

Boyer (forthcoming) tests the hypothesis that counterintuitivity contributes to better memory recall in circumstances in which other factors are controlled, finding that items violating expectations are

better recalled than similar, non-violating items. Finally, Boyer (1998) claims that the constraining features of intuitive ontology—a set of principled, domain-specific inferential capacities—help us understand the recurrent features of acquired culture in diverse areas such as folk-psychology, representations of natural kinds, the uses of literacy, acquisition of scientific beliefs, and religious ontologies. He also develops the ideal of cultural transmission along domain-specific paths, called "cognitive tracks," which he says are governed by intuitive ontology. Boyer claims that cognitive tracks provide testable explanations for recurrent features in the anthropological record (also see Boyer forthcoming).

Recurrence provides the back door into Boyer's (1990, 1994) discussion of counterintuitive ontologies. According to Boyer, in the competition among religious notions, those that achieve an optimal cognitive balance between intuitive and the counterintuitive (e.g., gods and ghosts) are most likely to be given attention, to be remembered, and, hence, to be passed on to succeeding generations. (Ironically, it is just this idea that many scholars seem to remember when reference is made to Boyer's work!) Atran (1996, 234) contributes to a similar line of reasoning when he notes that supernatural beliefs are just as counterintuitive for people who think them true as for those who think them false. Atran also claims that people who hold supernatural beliefs to be true ritually proscribe situations of conflict with intuitively mundane beliefs, and that they invoke non-conflictual aspects of intuitive belief systems to give mundane content to supernatural worlds.

Boyer (1990, 1994, 42–43) identifies four repertoires of religious representations—the ontological, the causal, the episodic, and the social—and he claims that their nonrandom patterning proves the existence of fundamental cognitive mechanisms, e.g., schemata, categories, assumptions, intuitions, and representations. The existence of these fundamental mechanisms makes it likely, says Boyer, that people will acquire and transmit certain religious ideas (for reviews of Boyer's work, see Barrett 1996; Bourguignon 1995; Dow 1995; Guthrie 1996; O'Flaherty 1996; Parmentier 1996; Wiebe 1996; also see Boyer's 1995 reply to two of these reviews).

As with Sperber, while Boyer provides us with many worthwhile theoretical ideas, many elements of his theory have yet to be tested empirically. Again, the challenge will be to operationalize the variables in Boyer's model, such that the ontological, causal,

episodic, and social repertoires may be distinguished and observed in concrete contexts. The value of Boyer's contributions notwithstanding, it also remains important to recognize that Boyer's solution is only one among many possible solutions to the conundrum of belief acquisition and cultural recurrence; Boyer's work merely paves the way for further theoretical exploration by scholars interested in these complex phenomena.

Sperber and Boyer's theoretical work, and their willingness to examine religion as a specific case study, certainly will help set the stage for the fruitful development of a cognitive science of religion. But in attempting to account for the successful propagation of one religious narrative or ritual over others, we also must remain attuned to social, psychological, and other factors. Charismatic leadership plays a role in the success of any religion, as does the psychological make-up of religious adherents. In addition, specific religious doctrines sometimes are promoted in order to strengthen individual and institutional agendas. By attending to social, psychological, and political realities, we can begin to tease apart how the cognitive properties of narratives, beliefs, and rituals work together with individual, collective, and institutional agendas to create powerful religious systems that roll forcefully into foreign lands and new millennia. Researchers in the emerging cognitive science of religion, therefore will need to collaborate with sociologists, psychologists, and political scientists to begin to sort out the complex and lived realities associated with the cognitive dimensions of religion.

THE ORGANIZATION OF THIS BOOK

Many of the chapters in this volume emanate from an international meeting, "Cognitive Science and the Study of Religious Experience: A Working Symposium on Theory and Method," held at the University of Vermont in June 1998 (also see Andresen and Forman 2000) and sponsored in part by the John Templeton Foundation. Part 1 of our volume, "Belief acquisition and the spread of religious representations," includes chapters that combine connectionist ideas from cognitive science with adaptationist ideas from evolutionary biology. Referencing Boyer (1994) and employing both biological models and metaphors (Sperber 1994, 1996) and adaptationist theory (Guthrie 1980, 1993; Pinker 1998; also see Bourdillon 1980; Adams 1981; Crapo 1982), studies of this type discuss "mental representa-

tions" (e.g., Pyysiäinen, McCauley, Lawson note that throughout this volume authors' names with no date refer to chapters in this book) and "counterintuitive ontologies" (e.g., Saler, Pyysiäinen, Guthrie). Part II, "Questioning the 'representation' of religious ritual action," includes chapters that involve empirical research at the interface of connectionism and linguistics. These chapters focus on religious ritual action (McCauley) and on empirical research regarding this action (Lawson, Barrett). Part III, "Embodied models of religion," examines Husserlian-style phenomenology (Kamppinen) as a component of an enactive approach to the cognitive science of religion (Varela). It also includes a plea for a more rigorous scientific investigation of religion involving neuropsychology, and emphasizing the role of the frontal lobes (McNamara).

Benson Saler's chapter begins our volume by critically dissecting the notion of belief. According to Saler, while anthropologists rely on what their informants "believe," many of these same anthropologists do not raise fundamental questions about the nature of belief *per se* (Goodenough 1993 provides a counterexample). Saler surveys three broad strands of philosophical speculation on this topic: (1) the classical mental state theory, which was the dominant perspective on belief until the 1930s; (2) the dispositional theory, which was popular among most English-speaking philosophers in the mid-twentieth century; and (3) the cognitivist theory, which is a new variant on the mental state theory. Saler ends by noting Boyer's admonition not to conflate the cognitive and epistemic, which Saler believes may be complementary.

Ilkka Pyysiäinen's chapter recognizes the importance of emotions for human cognition and for our understanding of religious experience (also see Watts 1997, 1999). Pyysiäinen combines the study of religious representations with the study of emotion, showing that "counterintuitive representations" are not only evocative and addictive in the sense that Boyer and Sperber think they are, but that they also elicit strong emotional reactions, thereby enhancing the memorability of religious ideas and contributing to their propagation. Pyysiäinen specifically interprets religious experience as an emotional reaction to counterintuitive representations, and he critiques both the cognitivist account of cognition and Sperber's epidemiology of religion for failing to discuss emotions adequately (also see Henry 1986).

Stewart Guthrie's chapter presents a general cognitive theory of

religion based on the notion of anthropomorphism. Like Pinker (1998), Guthrie claims that religion is a spandrel, i.e., a by-product of adaptation, and that our tendency to animate and anthropomorphize the world constitutes an innate cognitive strategy to interpret ambiguous things and events as what is both alive and human. Arguing against the views put forth by Sperber (1996) and Pyysiäinen, Guthrie believes that the "cognitive default" to over-estimate what is animate and human in the world is part of a broad cognitive and perceptual strategy to interpret the world's ambiguities as those possibilities that matter most. Interpreting shadows as persons and sounds as signals may confer an advantage on human beings, because if these interpretations are right, they are invaluable, and if they are wrong, they are relatively harmless. For Guthrie, an explanation encompassing both animism and anthropomorphism must be based in a comparative psychology informed by evolution, and that it must delineate our needs and interests, especially our broadest cognitive need, which is to distinguish aspects of the environment.

The chapters in Part II of our volume expand the cognitive approach to religion articulated in Lawson and McCauley's *Rethinking Religion* (1990; for a review, see Godlove 1993), which was written in dialogue with Sperber's earlier book, *Rethinking Symbolism* (1975). Arguing against Sperber's distinction between linguistic and symbolic systems, Lawson and McCauley claim that symbolic and especially religious ritual systems are more rule-governed than Sperber allows. They also use a connectionist cognitive framework focusing on linguistic theory to account for religious ritual action. Arguing that religious ritual participants possess a system of implicit knowledge involving concepts of superhuman agency and superhuman immediacy by means of which they make judgments about ritual form, Lawson and McCauley hold that religious participants detect agents, and they also attribute to these agents the special qualities they must possess in order to be efficacious. Furthermore, cognitive mechanisms enable ritual participants to know the difference between an agent, an action, and a patient; to know the means by which the action is performed; and to know the special qualities that agents and/or patients should possess in order for the ritual to accomplish its objectives. The authors also sketch the contours of a specialized Action Representation System (ARS), which enables humans to represent agents and actions in the world (also see Lawson 1993).

Lawson and McCauley's (1990) theory draws on Chomsky's generative grammar to formalize its claims. As we have seen, cognitive theorists offer many solutions to the puzzle of knowledge acquisition

proponents of the autonomy of cultural systems postulate the presence and operation of subtle, hidden cultural forces that transmit culturally constrained knowledge from a so-called cultural system to the "empty" minds of cultural participants. Alternatively, nativists hypothesize innate cognitive mechanisms replete with cognitive content. Lawson (1993, 188 196) suggests, however, that "competence theorizing" offers a fruitful approach to phenomena such as religious ritual that bridge the cognitive cultural divide. In a move analogous to one Chomsky applies to language, Lawson and McCauley apply competence theorizing to the analysis of symbolic behavior in religious rituals using representations in the minds of ideal ritual participants as the theoretical object.

In his chapter for this volume, Robert McCauley notes that since many religious systems emerged among populations that were mostly illiterate, religious and ritual systems have evolved to exploit variables that facilitate memory. Although experimental psychology has shown that frequency enhances recall in certain circumstances, various religious rituals occur quite infrequently. Frequency therefore cannot explain memory for and transmission of all religious rituals. Instead, McCauley defends a "ritual form hypothesis," which holds that participants' mostly tacit knowledge of ritual form, rather than ritual frequency, is the critical variable determining how much emotional salience a religious ritual possesses. The ritual frequency hypothesis proposes that the amount of sensory pageantry and the amount of emotional stimulation any religious ritual involves are inversely proportional to the frequency with which that ritual is performed. Pyysiäinen's chapter contains similar ideas on emotion, which, though developed independently, nicely support McCauley's position.

In his chapter, E. Thomas Lawson contends that religious representations, while obviously cultural in content, rest on noncultural foundations of the sort outlined by the theory of religious ritual competence he devised previously with McCauley. Lawson contends that examining the relationship between the representation of religious ritual actions and the representation of actions generally helps us understand the noncultural foundations of religious ritual representations, especially since these involve the notion of agency.

To account for the presence of an Action Representation System (ARS), Lawson looks to the intersection of evolutionary theory and theories of cognitive structure and development. On the evolutionary front, Lawson hypothesizes that creatures with the kind of mental equipment specified by an ARS capable of distinguishing between agents and everything else would possess an adaptive advantage. Lawson also reports on his empirical work with Barrett, which substantiates his and McCauley's theory that religious representations are dependent upon ordinary cognitive systems for the representation of action.

Working from Boyer's (1994) notion that concepts organize experiences, including religious experiences, Justin Barrett argues that religious events and ideas appear radically different from ordinary experience because they violate certain default assumptions about things in the world. Having summarized traditional accounts from the psychology of religion, which describe a radical shift from crudely anthropomorphic god concepts in childhood to the abstract god concepts of adulthood, Barrett claims that challenges to the standard Piagetian developmental theme may be applied to the case of religion. In short, Barrett believes that differences between the measures used with children and adults have inaccurately maintained the anthropomorphic to abstract shift observed in god concepts. Barrett argues that contextual cognitive demands determine in part how anthropomorphic an agent concept is, both for children and for adults. Given enough cognitive demands, adults, too, will retreat to more familiar, simpler concepts to generate inferences, even if this means using anthropomorphic properties for God that they reject theologically (for more on cognitive development, see Keil 1989; Wellman 1990; Trevarthen 1993; Pierce and Cox 1995).

Matti Kamppinen begins Part III of this volume by arguing that elements of Husserl's "descriptive phenomenology" namely the centrality of intentionality, and the theory of wholes and parts are useful tools in studying the structures of religious meaning systems. Kamppinen emphasizes that religious ideas depend greatly on commonsense ontology, since, as Boyer (1994) argues, they violate some aspect of this commonsense ontology. Husserl's detailed interpretation of commonsense ontology is intertwined with his theory of wholes and parts, says Kamppinen, such that the cognized world is composed of spatial, temporal, and conceptual part–whole struc-

tures. Kamppinen also encourages us to distinguish precisely between the terms "cognitive" and "cultural." With respect to cognitive phenomena, the paradigmatic objects of research for the study of religion are propositional attitudes, or mental acts – beliefs, desires, fears, hopes, perceptions, etc. This layer of cognitive phenomena also is cultural, since the contents of these acts are public, and the means of expression are shared. Religious belief and ritual, therefore, are both cognitive and cultural. Part whole analysis becomes useful, then, since part whole relations obtain in the world of meaning systems through which religious worlds are cognized.

Francisco Varela's chapter focuses on direct, lived experience, which he claims gives the mind a certain depth unplumbed by current cognitive science. Using language analogous to the Madhyamaka Buddhist injunction to avoid the extremes of nihilism and reification, Varela encourages us to avoid the two extremes of "neuro-reductionism" and "ineffability" by cultivating an explicit, "mutual determination" between scientific analysis and experience (for more on "naturalized" phenomenology, see Roy *et al.* 1999). Varela observes that human experience commonly is examined in spiritual traditions, but that cognitive science has tended to interest itself in the cognitive faculties associated with ordinary, unexamined life. To remedy this situation, Varela (1996) has developed a research program dubbed "neurophenomenology," an experiential neuroscience informed by a methodology that avoids reducing experience to neural accounts. This program considers the relationship between external, scientific accounts of experience deriving from cognitive science and first-person, i.e., phenomenological, accounts deriving from lived experience (see Varela and Shear 1999). Varela specifically asks us to consider how these two domains of observation and description mutually constrain, or co-determine, one another. Also in language reminiscent of Buddhist injunctions to perceive the world differently by exploring a non-dual mode of perception, Varela points out that phenomenology, too, is a call to perceive our present world differently, and he concludes his chapter by encouraging readers to attend to the constitutive basis of the mutual reciprocity that makes the mental and experiential, the bodily and neural, cohere together.

In his chapter, Patrick McNamara's emphasizes the benefits of an experimental approach to the study of religion, and he suggests new directions appropriate to an emerging cognitive science of religion.

McNamara focuses attention on the frontal lobes of the brain, because agency and intentionality depend in part on neurocognitive networks in the frontal lobes, making them central to religious belief, rituals, and experience. He also suggests possible empirical studies in a cognitive science of religion, for example testing whether or not religious ideas develop normally in children with autism or with prefrontal lobe dysfunction. If god concepts do not develop in children with ToM impairments, says McNamara, then the hypothesis that ToM processes are crucial for religious ideas would be verified. He also points out that the link between ToM impairments and prefrontal dysfunction raises important issues regarding the role of executive cognitive functions (ECFs) in religious practices. ECFs refer broadly to cognitive activity involving planning, initiation, maintenance, and adjustment of non-routine, goal-directed behaviors. Focusing on the frontal lobes' function in religious experience brings up the role of the "Self" in religious practice, since representations of the Self appear to rely on right frontal networks (also see Vogeley *et al.* 1999; McNamara 1999b).

My own conclusion to this volume surveys prior cognitive analyses of religion and argues strongly for a new set of methodologies appropriate to an empirical cognitive science of religion. Over the past decade or so, theorists have developed a neuroepistemological model of religious experience; a theory of biogenetic structuralism, which interfaces biology, cognitive science, and religious experience; and theories of "cognitive operators" believed important for religious thought. Studies also have examined the relationship between cognitive complexity and religious affiliation; proposed physiological and neural correlates of religious experience; and posited a neural model of religious experience that focuses on so-called discrete ultimacy experiences. Although these neurobiological and neuropsychological accounts of religion have opened lines of discussion between disciplines and have encouraged collaboration between scholars, in many cases, these accounts do not constrain theorizing to fit empirical data. While much more empirical research is necessary before we establish a rigorous literature in the cognitive *science* of religion, we hope that this volume will facilitate the process.

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PART I

Belief acquisition and the spread of religious representations

CHAPTER 2

On what we may believe about beliefs

Benson Saler

I begin with certain claims that may stimulate some of you to disbelief. Surveys accomplished by well-known polling organizations suggest that about one in four adults in the United States "believes" that intelligent beings from outer space have been in contact with humans (Gallup and Newport 1991, 138; *TIME*, 23 June 1997, 66). And Jon D. Miller's surveys, which asked US adults whether or not they believe that "some of the unidentified flying objects reported are really space vehicles from other civilizations," elicited affirmative replies from 54 percent of the respondents in 1985, 57 percent in 1988, and 54 percent in 1990 (Frazier 1992, 346).

Extrapolations from the polls suggest that millions of people in the United States "believe" that extraterrestrial beings have actually contacted earthlings, and that even larger numbers affirm the reality of at least some unidentified flying objects as spacecraft from distant worlds. These figures, as one may expect, are welcomed by members of the UFO community. Thus, for instance, Robert J. Durant, a ufologist writing in the *International UFO Reporter* of November/December 1993, exults as follows:

> UFO proponents have won the war for public opinion. For every fundamentalist Christian there are five UFO believers. Roman Catholics comprise by far the largest Christian denomination in the United States, and UFO believers outnumber them by a ratio of better than two to one. UFO believers outnumber the voters who placed Reagan and Bush and Clinton in office . . . That UFOs are real is a solidly mainstream belief. (Durant 1993, 22–23)

Now, there are serious questions that can and should be raised about these polls. They typically solicit information by telephone from sample populations of between 900 and 1,400 people, and the pollsters estimate sampling errors of between 3 and 6 percent. We may well criticize the contents of the questions posed, the lack of

explication and follow-up, and the pollsters' apparent supposition that what people say in such cases stands in an uncomplicated relationship to what they think. What, indeed, does it mean to say that roughly one-fourth of the adult population of the United States "believes" not merely that "intelligent beings from other planets" exist, but that some of those extraterrestrials "have been in contact with human beings?" That question relates to a larger one: what does it mean to say that anyone believes anything?

"Belief," to be sure, is a matter of concern to members of the UFO community. Insofar as I am aware, however, it is not a problematical construct for them. Something similar may be said about some anthropologists. While statements about what their informants "believe" are crucial to their ethnographies, and while they may argue about how we are to understand local beliefs, numbers of anthropologists do not raise fundamental questions about the nature of belief. Their failure to do so reminds me of David Hume's remarks about that "operation of mind which forms the belief of any matter of fact, [which] seems hitherto to have been one of the greatest mysteries of philosophy: tho'," he adds, "no one has so much as suspected that there was any difficulty in explaining it" (1896 [1739], 628). "For my part," Hume goes on to say, "I must own, that I find a considerable difficulty in the case; and that even when I think I understand the subject perfectly, I am at a loss for terms to express my meaning" (1896 [1739], 628). My chapter attempts to sketch part of what constitutes "a considerable difficulty in the case," and it suggests that we may advance the study of religions by taking that difficulty into account.

Anthropologists have had much to say about beliefs. But most have talked about them as if their elicitation were less problematical than the interpretations to be put on their contents. With certain exceptions, moreover, numbers of anthropologists appear to have neglected much of what philosophers have written about belief. That, I think, is a serious failing. At the very least, philosophers apprise us of certain complexities and subtleties likely to be encountered in talk about belief.

PHILOSOPHICAL TRADITIONS

Three broad observations on the work of philosophers concerning belief are relevant to our interests in cognition and the study of

religion. First, and depending on one's classificatory preferences, we can point to two or three major theories of "belief" that have commanded the attention of philosophers in the twentieth century. The first, chronologically speaking, is the mental state theory. To distinguish it from a third theory, should we agree that there are three, we may call it the classical mental state theory. It has its roots in past centuries, and it was the dominant perspective on belief up until the 1930s. The second major theory may be called the disposition theory. It commanded the allegiance of most English-speaking philosophers in the mid-twentieth century and up until perhaps two or three decades ago. What we may term a third theory is a new variant, or set of variants, on the mental state theory. I prefer to treat it as a separate theory, both because it differs from the classical mental state theory in several significant ways and because doing so carries certain expository advantages. It may be called the cognitivist theory.

Second, philosophers committed to either the classical mental state or disposition theory frequently refer to conventions of language use; supporters of the cognitivist theory often do so, but such references on their part are less critical for their theorizing. Regardless of how they may otherwise differ in their theories of language and meaning, classical mental state and dispositional theorists commonly acknowledge constraints imposed by natural language uses, and they frequently refer to such conventions in their analyses and arguments. They are emulated in this by some anthropologists. Thus, for instance, Rodney Needham (1972) considers how the verb "believe" is utilized in English, and Jean Pouillon (1982 [1979]) likewise considers the French verb *croire*.

Third, and restricting ourselves to English, the philosophical literature associated with the three aforementioned theories attests strongly to the complex polysemy of "believe" and the noun "belief," both in common uses and in various philosophical formulations. Numbers of philosophers note and analyze discriminations such as those between "believing in" and "believing that," between believing propositions and believing persons, between first-person and third-person uses of the verb "believe", between strong and weak senses of the noun, and so forth. These discriminations, founded on the richness of natural language conventions, conduce to the conclusions that no single, simple model, and no monolithic definition, will suffice for either the noun or the verb.

Perhaps the oldest Western philosophical tradition respecting "belief" is the effort to distinguish it from, and relate it to, "knowledge." Plato associates genuine knowledge, *episteme*, with the Intelligibles, the immutable and eternal Forms or Ideas that can only be apprehended by the mind, while associating "opinion" or *doxa* with the Sensibles, the unstable and transitory particulars of experience that we bring into awareness through the senses. While later Western philosophers take varying positions respecting Plato's ontology of Forms, many follow him to the extent of distinguishing knowledge from belief and privileging knowledge over belief. While such privileging is salient in Plato and Aristotle and among twentieth-century positivists, it is also the case for numbers of Christian philosophers who extol certain sorts of belief in the form of "faith" (see below). Nowadays, there is a strong proclivity to reduce knowledge to belief. But not many years ago numbers of epistemologists commonly held that propositional knowledge "knowing that," as distinguished from "knowing how" is defined conjunctively "in the strong sense" by three conditions: belief, evidence, and truth (Scheffler 1965, 21).

The "belief condition" holds that knowledge entails belief. One presumably believes what one claims to know. The "evidence condition" maintains that one ought to have evidence for what one claims to know. Numbers of philosophers, however, allow that one can have knowledge in the absence of evidence, albeit knowledge in a "weak" sense. The "truth condition" requires that knowledge be incompatible with error. Thus, for instance, the Trobriand Islanders may believe that a human pregnancy is caused when a spirit enters any of several orifices in a woman's body. And they may believe that while sexual intercourse can be a facilitating factor, it (or, by modern extension, human sperm) is not necessary for a pregnancy to occur. On Malinowski's testimony the Trobrianders can be said to *believe* these things. But according to Western science and a strict reading of the classical Western epistemological tradition, they cannot properly be said to *know* them.

In a paper critical of various claims advanced by Edmund Leach (1967) respecting ideas about procreation reported by ethnographers for certain Australian aborigines and the Trobriand Islanders (and critical as well of Leach's interpretation of the doctrine of the Virgin Birth in mainstream Christianity), Melford Spiro (1968, 244) uses the expression "false knowledge." In doing so, he breaks with the

classical epistemological tradition (which deems "false knowledge" to be an oxymoron), but not with current practice, which reduces knowledge to belief. He does so in refuting Leach's assertions that claiming that a native is ignorant is tantamount to saying that s/he is "childish, stupid, superstitious," for, according to Leach (1967, 41), "Ignorance is the opposite of rationality." Spiro retorts:

> ignorance is the opposite not of rationality, but of knowledge; irrationality, not ignorance, is the opposite of rationality. To be ignorant of something, i.e., to have no knowledge (or false knowledge) is not necessarily to be irrational (or, for that matter, childish, stupid, superstitious, etc.). (Spiro 1968, 244)

Now, while the coupling of "knowledge" and "false" is acceptable to many of our contemporaries, it does not accord with the general perspective that we associate with postmodernism. The postmodernist may avoid imposing the judgment "false," on the ground that truth is authorized by a discourse. The coupling of "knowledge" and "false," however, accords well with certain conventions of high modernism. Those conventions elevate reported assertions to the status of theoretical claims and treat them as constituting a distinctive "knowledge," thus according them dignity within a relativist framework. At the same time, however, the modernist steps outside of that framework and identifies the claims as errors because they depart from what s/he deems to be objective facts.

My preference is to speak of "knowledge claims" rather than knowledge. By so doing, we recognize the provisional status of all such claims, our own included. Further, as Barnes and Bloor (1982, 23) suggest, research directed to why people may voice certain beliefs may prove more rewarding than concentrating on the truth or falsehood of what is purportedly believed.

MAINSTREAM CHRISTIAN TRADITIONS

While Western philosophical traditions generally treat belief as inferior to knowledge, mainstream Christian traditions sometimes accord certain sorts of belief a special dignity and importance. They do so, that is, in the case of beliefs that are claimed to derive from God and to be crucial for the possibilities of human salvation. Such beliefs are to be accepted largely or entirely on faith.

A stereotype (if not, indeed, a caricature) of the aforementioned

point of view is given in a phrase of broken Latin widely but mistakenly attributed to Tertullian: "*credo quia absurdum.*" What Tertullian actually wrote is, "And the Son of God died; it is believable because it can't be grasped" ("*credible est quia ineptum est*") (*De carne Christi* 5.4). In that regard, Augustine of Hippo exemplifies a popular subtradition, one that suggests the transformative powers of belief: "Understanding," he writes, "is the reward of faith. Therefore seek not to understand so that you may believe, but believe so that you may understand" (*On the Gospel of St. John*, 29,6). And Thomas Aquinas gives voice to another subtradition, one that holds that certain divine truths the Trinity and the Incarnation are the examples that he gives are supernatural mysteries that we cannot understand in this world. They are revealed to us by God, he writes, "not, however, as something made clear to be seen, but as something spoken in words to be believed" (*Summa contra Gentiles*, Bk.IV, 1:5).

Within the Christian tradition there has long been argument over the relative weightings that may be assigned to faith and to reason. Thus, for example, Origen declares of *pístis*, "belief" not deemed to be the product of reasoned conviction, "We accept it as useful for the multitudes, since, partly owing to the necessities of life and partly owing to human weakness, very few people are enthusiastic about rational thought" (quoted by Dodds 1965, 122). In short, differing opinions exist within the Christian camp. On balance, however, Christian theologians celebrate certain sorts of belief, and by so doing they produce something of a subtext to traditional epistemological considerations of belief as it relates to knowledge. This, however, often lends reinforcement to the classical distinction between knowledge and belief. Faith that corresponds to divinely revealed truths, numbers of Christian theologians and philosophers maintain, *is* knowledge, and it can produce within the believer a sense of certitude that transcends the certainties implicated by other forms of knowledge. As a famous line in Handel's *Messiah* puts it, "I know that my Redeemer liveth" not merely, "I believe that my Redeemer liveth."

Now, in addition to considering belief with reference to knowledge, philosophers also look at belief as a complex phenomenon meriting particularized analysis. As is generally the case with efforts at characterization and explication, they invoke a vocabulary of other terms, some of the more prominent among them being opinion, conviction, entertainment, assent, acceptance, faith, dis-

position, doubt, and suspicion. A global treatment of belief would consider these and other terms. Here, however, it must suffice to foreground just two of them: assent and disposition.

Assent pertains with special relevance to the (classical) mental state theory or occurrence analysis of belief (Price 1969), and disposition pertains with special relevance to the disposition theory, or dispositional analysis, of belief. Both of these theories admit of variants. The line between them, moreover, is far from sharp. Occurrence analysts acknowledge a dispositional sense of belief, though treating it as derivative or secondary (Price 1969, 244–245). And dispositional analysts concede that when a person is disposed to use a proposition as a premise for making a conscious and explicit inference, that person must assent both to the proposition and to the inference drawn from it; such assentings can be described as mental occurrences (Price 1969, 296).

THE (CLASSICAL) MENTAL STATE THEORY

The mental state theory holds that when one believes, something happens. That is, an alteration in mental state occurs. In this view, one entertains a proposition in the mind and believing, construed as a mental act or event, occurs when one mentally assents to that proposition. John Locke maintains that there are degrees of assent, ranging from full confidence or conviction to doubt or distrust (1959 [1689]: Bk. IV, Sect. 2, Ch.15). John Henry Newman (1913 [1870], 124–137), however, disagrees with Locke. He holds that assent is a matter of yes or no: that while there are degrees of inference, assent is unconditional. Locke's view, I think, is closer to what most of us suppose.

Yet while many may tend to think that there are degrees of assent, they do not always represent beliefs in that way. The polls about extraterrestrial spacecraft and alien encounters that I referred to earlier typically solicit assent to, or dissent from, voiced propositions, with narrow allowance for expressions of "no opinion." In writing up the results of polling, moreover, assent and dissent are often represented as if they were unconditional. But on more extensive interview, self-declared "believers" evince diversity in their statements, ranging from hedged affirmations to strongly affirmed convictions.

The mental state theory generally holds that the believer can introspect his or her beliefs, and by introspection can come to know

the degree of belief (Price 1969, 248). According to this view, the believer is privileged over all others for while others may make shrewd inferences about what the believer believes, only the believer can know what is believed with full warrant. But this is not the case for the disposition theory. According to that account, the believer is not advantaged over others, for, as Price (1969, 249) puts it, "Any knowledge he can have about his own dispositions is as indirect as the knowledge which other people can have about them."

The mental state theory, I think, began as a folk theory about beliefs. Philosophers suggested various refinements, refinements often based on close attention to how people generally speak about beliefs or how they speak in averring what it is that they do or do not believe. It is my impression that the mental state theory, in elemental form, continues to be the prevailing folk theory of belief in our society. It is, moreover, part and parcel of folk belief desire psychology, a powerful assemblage of existential assumptions and understandings that underwrite a host of operative expectations about human behavior.

THE DISPOSITION THEORY

According to the disposition theory, when we say that someone believes something, we are claiming that that person has a tendency or readiness to act, feel, or think in a certain way under appropriate circumstances. This may include verbally and publicly affirming a proposition on occasion. Disposition analysts agree with (classical) mental state theorists that entertaining a proposition is an occurrence. Further, acquiring (or losing) beliefs, on this view, are occurrences, and beliefs are likely to manifest themselves in occurrences, but those occurrences are not acts of believing, and belief is not an occurrence (Price 1969, 20).

The argument between classical mental state theorists and disposition theorists over the nature of belief did not, insofar as I am aware, become a widely diffused issue in anthropology. Most of the ethnographies that I have read incorporate statements about what the natives believe. Such statements for the most part seem to accord with the classical mental state theory, i.e., they accord with the regnant folk theory of belief widespread in our society. Further, there are relatively few explicit definitions of belief given in the anthro-

pological literature. But up until the last decade or two, those few that were obviously influenced by the philosophical literature tended to express a dispositional viewpoint, while others suggested the folk theory. Thus, for example, Robert Hahn defines beliefs as "general propositions about the world (consciously) held to be true," and he goes on to say that "*Holding a belief* is here explicated as exhibiting a disposition to behavior symbolic of that belief" (1973, 208). In contrast, Ward Goodenough defines beliefs simply as "propositions that people accept as true" (1963, 155).

It is my impression that anthropologists for the most part did not enter into the arguments among philosophers respecting beliefs. While treating beliefs as mental states, anthropologists also sometimes gave them a dispositional sense, without apparent awareness of contested issues in philosophy. Disposition is a powerful concept, and it is made use of in personality theory and in other strands of theorizing that are of interest to anthropologists, particularly by anthropologists who specialize in psychological anthropology.

The disposition theory, endorsed in one form or another by such famous philosophers as Ludwig Wittgenstein and Gilbert Ryle, was itself part of a larger intellectual perspective that dominated Anglo-American psychology and philosophy in the mid-twentieth century. Most commonly referred to as "behaviorism" in psychology, that perspective was unsympathetic to the idea of mental states and to the Cartesian dualism of mind and body. Behaviorism as a coherent intellectual program in psychology, however, could not withstand its critics, one of the most powerful of whom was Noam Chomsky, whose famous review (1959) of B. F. Skinner's *Verbal Behavior* called attention to some of the conceptual weaknesses of behaviorism. Yet while behaviorism as a persuasive research agenda within psychology was damaged, philosophical objections to the idea that mental states are real (as distinct from being fictional posits) persisted. They did so not under the tattered banners of "behaviorism," but under the rubrics of "eliminative materialism" or "eliminativism."

Eliminativism, in its strongest form, is the claim that beliefs, desires, and various other mental states do not exist except as fictional posits deriving ultimately from the mistaken assumptions of folk psychology (Churchland 1981; Stich 1996, 3–4). Those who do battle with eliminativists are sometimes called realists, for they affirm, to one extent or another, the reality of mental states.

THE COGNITIVIST THEORY

In a work published in 1969, H. H. Price (1969, 243) writes that the occurrence analysis of belief, the classical mental state theory, "is now almost universally rejected, at any rate in the English-speaking philosophical world." Those lines were written in the declining but still potent years of behaviorism. Today, however, we witness the development of new theories that make unashamed, positive use of the expression "mental state." But rather than term these theories "New mental state theories," the designation "cognitivist" seems more appropriate, given the importance of the cognitive sciences both as locus and as framework for their development. Cognitivism embraces a number of alternative and competing views, but for expository purposes it is useful (if a bit risky) to generalize to some extent.

The (generalized) cognitivist theory differs from the classical mental state theory in a number of ways. It is, to begin, thoroughly physicalist or materialist in orientation. While the classical mental state theory tolerated or made room for what Gilbert Ryle called a "ghost in the machine" the notion that a non-physical object, the mind, could act upon and move a physical object, the body the cognitivist theory disallows such a possibility. When cognitivists talk about "the mind," they are talking about many of the functional aspects of a physical object, the brain, and they may sometimes use such conventions as "mind-brain" or "mind/brain" to drive home the point.

Second, arguments between those who affirm the reality of mental states (the realists) and those who deny such reality (the eliminativists) may sometimes turn on the expectations or bets of the latter that neuroscience eventually will liberate us from the last vestiges of folk psychology, which supposes beliefs to be mental states. Or so, for example, Daniel Dennett suggests of Paul Churchland, whom he credits with appreciating the predictive powers of "the intentional stance" (a strategy for interpreting the behavior of an entity by treating it as if it were a rational agent that is guided in choices by beliefs and desires). Yet while Churchland appreciates the intentional stance's utility, he also holds that it will eventually end up on the trash heap of discarded constructs and theories. Why? Because, Dennett (1998, 119) writes, Churchland "anticipates that neuroscience will eventually perhaps even soon discover a pattern

that is so clearly superior to the noisy pattern of folk psychology that everyone will readily abandon" folk psychology in favor of neuroscience "except, perhaps, in the rough-and-tumble of daily life."

Third, the cognitivists do not attach the same importance to ordinary language conventions for talking about belief as did the classical mental state theorists. This is not to say that they ignore such conventions. Given their interest in folk theory, total disinterest would hardly be likely. But they do not allow ordinary language conventions to constrain their theorizing to the same degree as did the classical theorists.

Fourth, the cognitivists sometimes evince a phylogenetic interest and sensitivity that were not much in evidence among the classical theorists. The latter generally restricted their interests in belief to the human. Some of the former, however, raise questions about whether or not animals can be said to believe and some even play with the notion that belief in some sense may be attributed to non-living things (Dennett, for example, is fond of the thermostat).

As Dennett (1998, 324) points out, some (but not all) cognitivists ascribe "a special, non-ordinary sense" to belief, using "belief" as "the *generic*, least-marked term for a *cognitive* state." By doing so, indeed, "whatever information guides an agent's actions is counted under the rubric of belief," at least in applications of the term in English (1998, 324). Dennett, in adopting a realist position, rightly recognizes different degrees of realism. He opines, moreover, that "a mild and intermediate sort of realism is a positively attractive position" (1998, 97), and in accordance with his preference for the mild and intermediate, he claims that "beliefs are best considered to be abstract objects rather like centers of gravity" (1998, 97). He remarks, further, that "the maximal leniency" of his position "is notoriously illustrated by my avowal that even lowly thermostats have belief" (1998, 327). But not all philosophers accept that position. Donald Davidson (1975), for instance, prefers to restrict belief to language-using animals that have and that distinguish between concepts of truth and falseness. In any case, the generalized cognitivist theory certainly allows for what the folk (and most anthropologists) generally mean by belief. That on the theorizing of some philosophers it may also allow for a good deal more ought to stimulate cerebration among cultural anthropologists, even though we ordinarily stop well short of doing research among dogs and cats, let alone thermostats.

Fifth, unlike classical mental state theorists, but rather much like disposition theorists, cognitivists do not privilege the believer as having the best knowledge of what s/he believes. Cognitivists sometimes explicitly allow that there can be beliefs of which the "believer" is unaware. Such, of course, is always the case for thermostats and other non-living entities the behaviors of which, according to some philosophers, can be rendered intelligible (patterned) through invocations of a widened idea of belief. But it may sometimes be the case among human beings as well.

Sixth, and unlike both classical mental state theorists and disposition theorists, cognitivists make significant use of the vocabulary that we ordinarily use for talking about computers. Some of that language, to be sure, is taken metaphorically. But a good deal of it (e.g., "computation," "processing," "default assignment") is applied non-metaphorically. Indeed, to verge briefly on the technical, the "computational model" is important in the theorizing of many cognitivists. In drawing parallels between the operations of the brain and the operations of a computer, however, cognitive theory generally employs a far more sophisticated understanding and appreciation of computers than do many ordinary computer users. A computer, in cognitivist applications, is a physical instance of a formal system (Jones n.d., 15). A formal system consists of the stipulation of elements and the stipulation of a set of rules for operating on those elements. Viewing the operations of the brain as the expressions of formal systems is both an analytical and a theoretical ploy for many cognitivists. It should be noted, however, that the "classical" cognitivist view of the mind-brain as a general device and/or a set of "modules" for computation, for the manipulation of symbols in accordance with a set of rules (the so-called "Rules and Representations" account of cognition), has come under increasing criticism. That is especially so with respect to the idea that cognitive processes can be adequately and revealingly simulated by computer programs of the sorts presently available. In addition to a number of specific complaints, there is the overall charge that, as Horgan and Tienson (1996, x) put it, "The cognitive processes of natural cognizers are too rich to be captured by programmable rules." That conviction, in tandem with certain other considerations, has stimulated the rise of what are variously viewed as alternative approaches or varietal extensions and supplements. Those include, for instance, connectionism (see Andresen,

"Towards a cognitive science of religion"; Varela), which Steven Pinker (1997, 114) describes as a variety of the computational theory. In any case, the newer developments, insofar as I can judge, do not compel us to alter radically our uses of the term "belief," and I shall say no more about them here.

Now, while I have been generalizing (perhaps overgeneralizing) above, I do not want to leave the impression that there is a well-formed cognitivist theory the details of which command the allegiance of most cognitivists. Cognitivism embraces an expanding universe of emerging theories. While they are well beyond the primordial chaos that we associate with the Biblical *tohu v'vohu*, they are still in development. Further, their protagonist-developers differ strongly among themselves on numbers of points, some of them quite technical. But if cognitive realists were to search for a manifesto to express the core of the consensus that they have thus far reached, they may do well to adopt these words of John Searle:

> On my view, mental phenomena are biologically based: they are both caused by the operations of the brain and realized in the structure of the brain. On this view, consciousness and Intentionality are as much a part of human biology as digestion or the circulation of the blood. It is an *objective* fact about the world that it contains certain systems, viz., brains, with *subjective* mental states, and it is a *physical* fact about such systems that they have *mental* features. The correct solution to the "mind body problem" lies not in denying the reality of mental phenomena, but in properly appreciating their biological nature. (Searle 1983, ix)

BELIEF AND THE ETHNOGRAPHER

Immersion in the ethnographic field tends to implicate a number of problems respecting beliefs. One of the most salient, of course, is the problem of translation. As W. G. Runciman (1969, 150) succinctly puts it, "Although beliefs of any sort may be legitimately *explained* in categories foreign to the subjects themselves, they can only be *identified* in the subjects' own terms." But even where the ethnographer has mastered the local language and achieved profound understandings, there are still likely to be general problems in effecting translation problems having to do, for instance, with mapping correspondences (glosses) across languages, preserving (if we deem it a desideratum) truth values, and so forth.

Problems of translation are especially difficult when it comes to

ideas that we associate with religion. Suffice it here to mention briefly two of the several reasons. First, as Pascal Boyer (1994) notes, religious ideas are likely to incorporate some counterintuitive elements, and counterintuitivity can exacerbate the difficulties of translating. How does one convey non-intuitive formulations encountered in the ethnographic field to readers academics, say whose own non-intuitive adventuring may take a different direction? Second, important terms may be used in a variety of contexts and pertain simultaneously to different domains of interest, and informants may have difficulty in explicating them. Learning and then conveying their complexities and nuances is not easy.

Various belief assertions recorded in the ethnographic literature statements, for example, that some people are parrots, that twins are birds, and that the sun is a white cockatoo pose something of a challenge for many anthropologists. What are we to make of those statements and many more like them? In attempting to answer that question, however, some anthropologists devote more ingenuity to explaining away the troublesome assertions than to explaining them. In so doing, they engage in a distinctly anthropological version of "saving the appearances" they attempt to save the natives, to save them, that is, from charges that they are childlike, irrational, or worse. Such efforts, I suspect, are often motivated in part by ideological commitments.

In any case, efforts to save the appearances, native division, are diverse. Virtually all are clever, and they are often plausible to some extent. Thus, for instance, it is sometimes suggested that the troublesome beliefs are not really existential claims, that they are not general statements about the world, so much as they are emotional or evocative declarations. That suggestion can command our partial endorsement in that beliefs often function in multiple ways; but once we acknowledge multiple functions we must also allow for their intellectual contents and potential consequences. Other ploys are to argue that various belief statements are not really full propositions in the logician's sense (Sperber 1982), or that they are deployed in accordance with the canons of some non-Aristotelian logic, such as Hans Reichenbach's adaptation of Jan Lukasiewicz's tri-valued logic (Cooper 1975), or something of the sort. But the best-known and most widely used strategy is subsumed under the rubric "symbolism" (Skorupski 1976).

The symbolist tends to treat religious statements that may other-

wise prove troublesome as symbolic affirmations about social relations and social structure. While generally admitting that such statements have "literal" meanings a sometimes facile admission that G. E. R. Lloyd (1990) warns us against symbolists tend to gloss over or ignore their own admissions in favor of focusing on another level of meaning: what the utterances purportedly say, in coded form, about social life. This level of meaning, symbolists suggest, is the real significance of many religious beliefs. Thus, for instance, according to Edmund Leach (1967), the reported Trobriand beliefs to which I referred earlier are not to be understood as components of an erroneous or defective theory of human procreation, as Spiro supposes. Rather, they are cultural dogmas that make sociological sense, for they are symbolic affirmations and justifications of certain realities in Trobriand social life. Their significance is not biotheoretical but sociological.

One potential problem with such an attempt to save the appearances is put in this way by John Skorupski (1976, 13): "a metaphorically or symbolically expressed thought is a thought expressed in a form which *does* have a literal meaning . . . and . . . the literal meaning of the words must be grasped if one is to 'decode' the meaning which *is* to be understood." The "meaning which is to be understood," of course, is the meaning that the anthropologist is to understand. Lloyd (1990), a classicist who traces the literal/metaphorical distinction to the polemical interests and conventions of the ancient Greeks, warns that not all peoples may make a similar distinction, and that we need to find out whether or not they do rather than facilely impose a literal/metaphorical distinction on them. If in fact some people do not recognize such a distinction, what is it that they do understand when they make assertions that we interpret to be belief declarations?

If the reported assertions are empty clichés, then their presumptive significance must be evocative, emotional, and/or nostalgic. But if they do have some intellectual meaning for those who affirm them, it is something of a stretch to claim that the believers themselves deem them coded claims about social reality. The believers may conceivably *use* the reported beliefs as premises for drawing inferences about social structure, but on occurrence, dispositional, and at least some cognitivist accounts of belief, that would mean that the reported beliefs have an intellectual value in keeping with what they affirm existentially.

As difficult as it may be to sustain the symbolist perspective in the Trobriand Islands, it is even harder to make a cogent case for it among my friends in the UFO community. To the extent that members of that community affirm strong convictions and numbers of them do the asserted beliefs, I have been given to understand, are not intended by those who assert them to be "symbolic" of anything. Rather, they are proclaimed to be statements of cold, hard fact, or irresistibly logical conclusions, or sober and plausible inferences. And if you or I do not openly acknowledge them as such, it is because we are ignorant, or dupes, or agents of an obstinate conspiracy orchestrated by the federal government and the scientific and military establishments (Saler, Ziegler, and Moore 1997).

In research now in progress, I am attempting to find out why numbers of persons who do not claim to have been abducted by aliens profess belief in alien abductions. Those who profess belief most commonly supply two reasons for their profession: (1) the abductees (or "experiencers") impress them as being sincere in their claims, whether the claims be voiced under hypnosis or furnished seemingly from conscious memory; and (2) experiencers give very similar accounts of their experiences, and in light of geographic and other diversities, collusion in so large a group of persons is implausible.

I concede that the apparent sincerity of experiencers can sometimes be striking. But the second reason, I think, is not as strong a reason as those who profess it often appear to suppose. First, the accounts given by experiencers are not all that similar there are numbers of significant differences. Second, those who profess belief in the abductees' accounts strike me as often underestimating the extent to which the media (TV especially) have cultivated and widely diffused both ideas about alien abductions and a vocabulary for talking about them. Abductees and others draw on those ideas and vocabulary. And third, some theoretical considerations and claims recently advanced by Pascal Boyer can contribute to our understandings of how the experiencers and those who profess to believe them (as well as numbers of media writers, producers, editors, and others) draw upon similar intuitive ontologies, how they are constrained as to what sorts of counterintuitive claims they might accept or proffer, and why, indeed, the experiencers often impress others as sincere.

PASCAL BOYER

In accounts rendered by people who claim to have been abducted by aliens, the aliens are usually described partly in anthropomorphic terms (see Guthrie). At the same time, however, they are often credited with doing certain things that human beings do not "naturally" do. They are reported, for instance, to pass through locked doors or other solid impediments. Not only that, but the people whom they abduct, the abductees or experiencers, are made to pass through closed windows, walls, the roofs of cars, and other solid substances. Passage is not "supernatural" but is made possible by an alien science and technology that are superior to those of earth. Such alien technology, moreover, is even understandable to some extent, though not in sufficient detail as to be patentable. The "transporter" in *Star Trek*, first and second generations, is something of a model that can guide our understanding.

This matter of passing through solid matter is very similar to one of Pascal Boyer's examples of counterintuitive claims. Boyer says nothing of aliens and experiencers, basing his examples instead on more traditional religious fare: gods, spirits, and ghosts.

Boyer's 1994 book, *The Naturalness of Religious Ideas*, is concerned both with explaining the transmission of religious ideas from generation to generation and with accounting for the recurrence in different human minds of similar religious assumptions, such assumptions being taken as examples of mental representations. Focusing for the moment on transmission, Boyer argues that in the competition among ideas for a place, so to speak, in the human mind, those ideas that strike an optimal cognitive balance between the intuitive and the counterintuitive are most likely to be given attention, to be remembered, and to be passed on to succeeding generations. Gods, spirits, and ghosts, for instance, are often depicted as anthropomorphic in various ways, and their conformance to our expectations respecting human capacities, purposes, and behavior renders them plausible. But it is the counterintuitive capacities and qualities assigned to them their invisibility, their ability to pass through material barriers, and so forth that render them memorable. People, moreover, are likely to know more about religious beings than is transmitted through socialization and enculturation. Indeed, the richness and saliency of religious ideas are likely to be underdetermined by culture. That is largely because,

Boyer argues, people make inferences on fragmented material, basing their enrichments of religious ideas on prior ontological assumptions. Individuals tend in many cases to rework ideas rather than simply accept them.

All of this, I think, is very much the case for abductees and for those non-experiencers who profess to believe them. Boyer's insights and arguments help us to account both for similarities in the contents of avowed convictions and narratives and for some of the differences. Abduction stories for many persons in our society, believers and disbelievers alike, are simultaneously intelligible, novel, and familiar. Yet while an appreciation of commonalities in attending to the intuitive and to the counterintuitive helps us in beginning to understand why persons who positively cathect such stories might impress others as sincere (intelligibility being something of a condition for judgments of sincerity), we are still a long way from cogent and non-superficial explanations of why some accept abduction accounts and others reject them. Heterogeneity both in belief and in cathexis of belief remains an issue that deserves study.

I turn now to what Boyer (1994, 287) describes as "the central question" of his book, "How can we account for the recurrence, in very different cultural environments, of particular aspects of religious ideas?" Such recurrences, he makes it clear, are not recurrences of identities. Beyond our minimal recognition that in many human groups there are ideas "concerning non-observable, extra-human agencies and processes . . . the similarities between religious ideas are a matter of family resemblance rather than universal features" (1994, 5).

Now, in attempting to answer his "central question" about the recurrence in different cultural environments of similar religious representations, Boyer proposes a number of hypotheses that are far too complex to summarize here. He writes, for instance, about constraints on the acquisition of religious ideas, constraints that are themselves constrained by domain specificity ("There is no reason to think that all types of mental representations are amenable to the same constraints" [1994, 287]). And he posits certain widely encountered psychological conditions and considerations, such as an almost universal preference for essentialism, a widespread use of abductive thinking in the enrichment of religious representations, the common attribution of belief desire psychology to posited sentient beings, and so on. In proposing a complex solution to the

question posed, moreover, Boyer criticizes a number of positions that have been espoused by many anthropologists. These include what he deems to be an exaggerated notion of the powers and inclusiveness of culture (a notion entertained by anthropologists, Boyer maintains, at the expense of developing a rich psychology). Two others are of particular interest to us here, given the general topic of this chapter. One is termed "theologism"; the other pivots on a distinction that Boyer draws between the "epistemic" and the "cognitive."

Theologism, Boyer writes, combines two mistakes:

> One is to take the connections between religious assumptions for granted, as a self-evident or necessary aspect of religious representations. The other is to think that they can be best described by postulating some abstract intellectual entities ("symbol systems," "webs of meaning," "cultural theories," etc.) that supposedly underpin the connections. Theologism, in its various guises, begs the question of systematicity by positing that religious representations *necessarily* constitute shared, integrated, consistent sets of assumptions, often in the face of less than perfect empirical confirmation. (1994, 229)

Boyer's point, one that various other writers also make, is well taken. It is worth cautioning, however, that in addition to guarding against the facile assumption that religious representations constitute well-integrated systems, we ought also to guard against the facile supposition that they do not. In either case, theoretical commitments to necessity could productively be bracketed in favor of detailed investigations.

Boyer's characterization of the "epistemic" approach to religious ideas, in contrast to the "cognitive," appears to overlap to an extent with what he says about the theologic fallacy. His "cognitive" approach is dedicated to describing the processes that can be said to lead people to entertain the thoughts or ideas that they actually do entertain. The epistemic approach, in contrast, views ideas as attempts to say something about the world (1994, 50), and it encourages the analyst to describe what people may intellectually support if they tried to make sense out of what they actually do and say (1994, 51). This, he warns, can lead to mistakes, as when certain properties that may be attributed to "the mental representations actually entertained" are, instead, "properties of their idealized (epistemic) description" (1994, 236). The investigator, Boyer correctly notes, does not actually observe idea-systems or worldviews. Rather,

the investigator observes people asserting various statements (1994, 114–115).

Now, if, by "idealized (epistemic) description," Boyer means description that cannot be adequately supported by the data in hand, then he is right to adopt a pejorative stance regarding the epistemic. I think, however, that Boyer paints the epistemic approach with too broad a brush in his book. First, beliefs, as Boyer himself recognizes, do not occur in vacuums. They are surrounded by other beliefs, and people typically render beliefs in subsets interactive. This is an understanding that is widely incorporated into cognitivist theory. Stephen Stich, for example, who advocates that we redirect attention away from a focus on the semantic contents of beliefs to a concentration on their syntactic relations, writes of "surrounding beliefs, the doxastic neighborhood, in which a belief is embedded" (1983, 93). Indeed, some cognitivists who view beliefs as mental states maintain that they are individuated by their interactions with other mental states.

Second, while Boyer is correct in pointing out that in the field we directly encounter people making assertions rather than belief systems, informants (sometimes without much prompting) often do explicitly connect various of their belief assertions. Further, people do not just "have" beliefs. They frequently *use* or deploy them in social interactions, in keeping with desires and interests, and there is meaning in that use.

Boyer's cognitive approach is important and useful. It is such not only with respect to understanding the transmission and recurrence of religious representations, but also with respect to pointing out various sorts of self-constructed traps that we may fall into in pursuit of "the native's point of view." But if we take—as I think that we should—Boyer's caveats seriously, an epistemic approach may be improved and thus better warranted.

Anthropologists have long desired to achieve what some call "emic models." They express, however, divergent opinions about what such models may actually be. Many suppose that an emic model is an "insider's model," or a model of certain aspects of "what goes on in the native's head." As I understand it, in contrast, an emic model is always an analyst's model. The analyst observes people saying and in other ways doing things. People typically make various distinctions and discriminations in doing what they do (saying, it should be remembered, is a form of doing). An emic

model is the analyst's effort to make sense of those distinctions and discriminations. If the model can accurately predict them back, then it has structural reality; but structural reality may not constitute psychological reality, especially if more than one model can predict back with equal power (Wallace and Atkins 1960).

The epistemic approach can be understood as an effort to achieve emic models (emic models in the sense endorsed here). Although I take seriously Boyer's strictures concerning the epistemic approach, including his caveats about conflating the cognitive and the epistemic, I nevertheless think that the cognitive and the epistemic can be rendered complementary. In my opinion, moreover, the line between them is not quite as sharp or as stable as some of Boyer's discussion may lead us to suppose. Analysts working within the classical mental state and disposition theories, as well as more than a few cognitivists, deem belief propositions to be potential premises from which further belief propositions could be inferred. It is here, I think, that the epistemic and the cognitive converge. Both Boyer and epistemologists recognize that belief does not beget belief. Procreation, so to speak, requires psychological intervention. And the uses to which beliefs may be put can have something to do with procreation or, at any rate, with desire and with birth-control.

EPILOG

Some years ago I wrote that belief is "a can of worms that many anthropologists do not seem to recognize as a can of worms" (Saler 1993, 92). That one-liner now strikes me as being as harsh as it is colloquial, and I welcome the opportunity to soften it a bit. We can, I think, believe of beliefs some of what we have ample warrant to believe of worms: that they have multiple functions, that it is specious to suppose them to have simple natures, and that they are part and parcel of life as we know it.

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CHAPTER 3

Cognition, emotion, and religious experience

Ilkka Pyysiäinen

"Religious experience" is a term used often, but it is a vague notion that can be approached from differing perspectives. It seems, however, to identify some such aspect of religion which is necessary for a satisfactory theory of religious concepts (McNamara). This aspect is missing in Dan Sperber's (1994, 1996b; Andresen, "Towards a cognitive science of religion") and Pascal Boyer's theories of the transmission of religious ideas, although these theories otherwise are very useful and to the point. Sperber views religious experience as *beliefs* that for various reasons have become widespread. In such an approach, it is, by and large, irrelevant whether anyone actually has had a postulated experience, "religious" or not. All that matters is the *idea* of the experience, and the way it is communicated. Robert Sharf's (1995) studies of a "rhetoric of meditative experience" share the same starting point but without such theoretical basis as Sperber's. Boyer's view, for its part, shall be discussed in more detail below.

The idea that religious experiences are mere beliefs about experience may sound quite odd to scholars who are used to thinking that subjective experience is a particularly important dimension of religion. They are partly, but only partly, right, and thus my own approach is a kind of compromise between these two extremes. I shall start with a few remarks about the background of Sperber's "non-experiential" approach, trying to show that it is one-sided and needs to be complemented by taking into consideration religious belief and emotions. After that I focus on the concept of "religiousness," and finally try to show how religious belief and "religious experience" can be understood as an emotional attitude towards counterintuitive representations. My view of religious experience is based on Joseph LeDoux's (1998 [1996]) and Antonio Damasio's (1996 [1994], 1999) neuroscientific theories on emotion, and thus

differs from the traditional, phenomenological, accounts of religious experience (also see McNamara).

In the background of Sperber's (1996b, 77 118) "non-experiential" epidemiology of representations, or of beliefs, is the so-called functionalist account of cognition, represented by Fodor (1975, 1998), among others. The functionalists believe that because both computers and humans are for example able to add 2 + 2 and arrive at 4, the fact that both achieve the same answer cannot be based on the similarity of the respective "hardware"; instead, it must depend upon the similarity of a process that occurs at a functional level. The mind is to the brain as a computer program (software) is to the hardware, and the mind can be explained without any detailed knowledge of the brain. It is the functional organization that is important, regardless of whether the device is composed of neurons, electrical components, or whatever. The human brain, in this view, is like a digital computer carrying out computations on material symbols. And, because we do not have conscious access to these computations, the whole notion of consciousness seems irrelevant. Consciousness is merely a useless projection of some subset of elements of the computational mind. By the same token, the notions of "emotion" and of "religious experience" become problematic (see Gardner 1987 [1985], 81 86; Varela *et al.* 1996 [1991], 6 8, 37 57; Dennet 1993 [1991], 1997a, 89 106, 1997b, 89 101; LeDoux 1998 [1996], 24 40). Within the connectionist alternative things are a bit different because connectionism is more closely based on the model of the biological brain (see, e.g., Churchland 1995; Clark 1997; McLeod, Plunkett, and Rolls 1998).

Disagreements between Fodor and Sperber (1994) notwithstanding, it is upon functionalism that Sperber has built his non-reductive materialist approach to culture. His reliance on functionalism also explains the fact that the reality of religious experience plays no role in Sperber's account: cold manipulation of symbols is all that there is. Although Sperber's epidemiology of beliefs may seem to work perfectly well without the reality of religious experience, something vital conscious experience and the emotional aspect of religion is missing. Agreeing with McCauley, I take it to be quite arbitrary to exclude emotions from considerations of religion. Religious experience can be understood quite simply as an emotional reaction to religious representations. In what follows, I shall try to combine such

emotional considerations with Sperber's and Boyer's approach to religious beliefs.

RELIGIOUS BELIEF

Sperber distinguishes between intuitive beliefs, which are simple descriptions of states of affairs, and reflective beliefs, which are only believed by virtue of second-order beliefs about them. Intuitive beliefs are produced by spontaneous and unconscious perceptual and inferential processes, and one is not necessarily aware of having them. Reflective beliefs are interpretations of representations embedded in the validating context of an intuitive belief (Sperber 1996b, 86 92). For example, "a stone cannot be in two places at once" is an intuitive belief, whereas "$E=mc^2$" and "God is everywhere" are reflective beliefs, accepted as true for differing reasons. A layman accepts "$E=mc^2$" as true because he or she believes that scientists have it right, while scientists have explicit rational grounds for accepting the same formula. Yet "God is everywhere" is accepted without explicit rational grounds by a different kind of specialist, the theologian (Sperber 1996b, 91). Explaining why this is so requires that we take the role of emotions into consideration.

In Sperber's epidemiology of beliefs, it is the mysteriousness of reflective religious representations that makes them "addictive." They are more memorable because of their evocativeness, and the most evocative representations are those that are closely related to a subject's other representations and that cannot be given a definitive interpretation (Sperber 1996b, 73, 90). Indeed, such formal features of religious representations may partially explain why they become widely distributed. But there is also the additional factor of truth claims that may play a role here. Religious ideas are often considered to be true because of a strong personal conviction, i.e. because of religious belief that has an emotional basis. As Wittgenstein (1966 [1938], 57) puts it, religious belief does not consist of hypotheses and probabilities, because (even) "indubitability is not enough in this case . . . indubitability wouldn't be enough to make me change my whole life." The Sperberian explanation for such convictions is based on the notion of evocativeness and on the distinction between intuitive and reflective beliefs. Sufficiently evocative beliefs are easy to defend against any criticism. And, if an evocative belief A is accepted because of some second-order beliefs about belief A, not

because of A itself, then no criticism of A will be relevant for the believer. It can, at best, lead to a reinterpretation of A, but not to its rejection. But evocativeness is also emotion-provoking.

Thus, in the extreme, the defense of an adopted conviction appears to be religious fanaticism, which can have positive as well as negative consequences for the well-being of the believers and their neighbors. Religion has a great potential to raise strong emotions, which may even involve specific neural mechanisms (Persinger 1987; Ramachandran and Blakeslee 1999 [1998], 174 188; McNamara; Andresen, "Religion in the flesh"). Thus, the "addictiveness" of religious representations may not be explained merely by their cognitive properties in the strict sense; it also may depend upon the emotions they evoke. Before dealing with emotions, we must consider the concept of "religion," however.

RELIGION AND COUNTERINTUITIVE AGENTS

Scholars of comparative religion have no scientific theory of religion. In addition to a number of competing definitions of the word "religion," we have little more than folk theories of religion, some of which include transcendent assumptions about the *sui generis* nature of religion (see Lawson and McCauley 1990, 33 41; Boyer 1993a; Saler 1993; McCutcheon 1997; Guthrie 1993, 5 17, 1996). Recently, an effort towards a cognitive understanding of religion has gained force, although scholars have mostly studied various kinds of recurrent patterns without trying to explain religion as a whole (Sperber 1975, 1996b; Lawson and McCauley 1990; Boyer 1994b; Whitehouse 1995). The approach closest to a general cognitive theory of religion is Stewart Guthrie's (1980, 1993, 1995, 1996) theory of anthropomorphism.

The cognitive approaches of Boyer (1994b) and of Lawson and McCauley (1990) attempt to account for the causal mechanisms that produce religious representations, not to delineate the actual content of such representations (see Kamppinen; Saler; Malley 1995). Thus, they do not explain why and how religious ideas arise in the first place; they explain only how individuals acquire and transmit religious ideas once they exist (see Guthrie 1996, 414 415). How, then, can we take seriously both what we know about the nature of cognition, and also the fact that religious representations are about something and are used for explanatory and other purposes (Saler)?

To begin with, we can supplement Guthrie's theory with a theory of agency (Guthrie has adopted the term "agent" but yet without a theoretical discussion; cf. Lawson; Barrett 1998, 617).

According to Guthrie's (1980, 1993, 1996, 416–417, and this volume) cognitive, evolutionary, and game-theoretical explanation, religion is characterized by the tendency to "anthropomorphize" nonhuman things and events in order to account for them in the context of the chronic uncertainty about the nature of the world. "Guessing that some thing or event is humanlike or has a human cause constitutes a good bet" (Guthrie 1996, 417), because if one is right, one has much to gain, while if one is wrong, one has only little to lose. Such a strategy results, not from pure reason, but from natural selection.

Not all anthropomorphism, however, is "religious." In addition, we need a more precise account of the concept of "humanlike" and of the cognitive mechanisms involved in anthropomorphism. Here, I first introduce the concept of "agency" (see Lawson) to account for anthropomorphism, and I then discuss the boundaries of the category of "religion," suggesting that religiousness is closely tied to counterintuitivity.

There is much experimental evidence to support the view that children begin to differentiate between people and inanimate objects during the first year of life and that they develop domain-specific knowledge concerning the behavior of human beings. However, we do not know how infants come to categorize an entity as a person and not as an object; nor do we know how infants reason about animals or self-propelled machines. We also do not know whether adults view themselves as physical objects with mental properties, or as mental beings with physical properties (Spelke, Phillips, and Woodward 1996 [1995]; Carey 1996a [1995], 282–292).

A self-propelled and acting being with cognitive capacities, such as a human being, is most conveniently termed an "agent." According to Leslie, the concept of agency is the outcome of the evolution of a domain-specific mind, with three distinct and hierarchically arranged processing mechanisms for three types of causation: mechanical; teleological; and psychological. Thus, three levels of representation of agency and three subtheories of agency have had an adaptive value in evolution because they confer an enhanced capacity to explain and predict social behavior (Leslie 1996 [1995], 121–123; Karmiloff-Smith 1992, 117–138). I argue that this should be

understood as the co-evolution of agents and the ability to detect agents, together with the ability to predict their behavior (see Varela *et al.* 1996 [1991], 151–235; Boyer 1994b, 288–295).

The specific mechanical property of agents is that they seem to have some kind of internal source of energy or force, which explains their self-propelledness. In terms of action, they act teleologically in pursuit of goals, and they react and interact. Thirdly, agents have cognitive properties, i.e., they are able to perceive, think, know, and remember; and they are conscious (Leslie 1996 [1995], 122). Leslie also postulates two specialized adapted learning mechanisms that produce information about the behavior of agents, the mechanisms of the theory of body and of the theory of mind. The first handles the mechanical properties of agents, while the second takes care of properties relating to action and cognition. The ability to attribute mental states to others clearly is an independent capacity, not a matter of general intelligence (Leslie 1996 [1995], 123–140; Kitcher 1996, 160–161). It is even possible that there is a "Theory of Mind Module" (ToMM) that can be localized in the frontal lobes of the brain (McNamara).

According to Susan Carey, research on infants suggests that the human mind is divided into at least the domains of language, numerical reasoning, physical reasoning, and reasoning about people. The domains can be thought of either as non-theory-like innate cognitive modules (e.g., Sperber 1994) or as theory-like cognitive structures embodying specific ontological commitments and the relevant modes of explanation, which is Carey's own view (Carey 1996a [1995], 1996b; Baillargeon, Kotovsky, and Needham 1996 [1995]; Hirschfeld and Gelman 1994a and b). Therefore, because reasoning about people, or intentional agents, is one of the four modules into which the human mind can be said to be divided, Leslie's theory of thinking about agents may account for the phenomenon of "anthropomorphism."

In this view, anthropomorphism results from the fact that, given their specific cognitive apparatus, probably localized in the frontal lobes, people are prone to see meaning and goal-directedness in all kinds of events, in life itself, or even in the existence of the world (see McNamara). This is what Boyer (1994b, 289–294), following Boyd and Richerson, calls a "runaway process" of cognition, a genetically determined process which is extended beyond its initial domain. And, because agents are the only sources of meaning and teleology,

people tend to postulate the existence of agents, even when agents cannot be observed. A good example is provided by proofs of God's existence in which the observed order in the universe is taken to prove that "there must be an intelligent designer behind all this." For example, Richard Swinburne (1996, 49) says, "If we can explain the many bits of the universe by one simple being [i.e. God] which keeps them in existence, we should do so even if inevitably we cannot explain the existence of that simple being." Thus, the genetically determined intuitive psychology is extended to counter-intuitive formations as well, without this necessarily contributing to the survival of the species.

An alternative explanation is suggested by Patrick McNamara, who argues that imputing mental states to others, which also involves the ability to feel empathy, is dependent on frontal lobe processing. Frontal lobes mediate emotions as well as non-routine and goal-directed behavior (see Persinger 1987, 9–11), and people engage with what I call counterintuitive agents in order to activate frontal lobes (unconsciously, of course). Thus, religious practices like prayer and meditation form one way of developing and training such cognitive functions that are crucial for personal autonomy, moral insight, and intellectual creativity. But, as McNamara recognizes, there are also other means of doing this, and our knowledge about religion and the frontal lobes is still tentative at best. It is therefore also possible that religion is a kind of frontal (and temporal) lobe activity "gone wild" (cf. Persinger 1987; Ramachandran and Blakeslee 1999 [1998], 174–188). The effects of religion are not always positive, after all. Although religion seems to have functional significance, it does not necessarily follow that it was adaptive from the beginning (see Saler 1999, 387).

Daniel Dennett (1987, 15–34, 69–80; 1997a [1996], 35–54) refers to this way of thinking as the adoption of an "intentional stance," interpreting the behavior of an entity by treating it as if it were a rational agent. The basic strategy of the intentional stance is to treat an entity as an agent in order to predict its actions. This stance combines with the physical stance and the design stance, to which it adds a new dimension. Although we can make use of the design stance to make predictions about such things as alarm clocks and vending machines, the intentional stance is almost obligatory when we need to explain the behavior of more complicated artifacts, e.g., chess-playing computers. These are not rational agents, but the

intentional stance works perfectly well as an "as-if" explanation of their behavior.

Interestingly, Dennett points out that the intentional stance represents a kind of anthropomorphism, in that by employing it, we treat all intentional systems as if they were just like we are. According to Dennett, the evolution of mind led our ancestors to animism, the attribution of intentions and desires to natural phenomena. Only quite recently have we become more sophisticated, withdrawing the intentional stance from inanimate nature. Although Dennett admits that adopting the intentional stance even towards nature may be an aid to comprehension, he nevertheless seems to think that in our "ancestors," it was more a question of ignorance of the real nature of things (Dennett 1997a, 43–45).

What is important is that in the absence of writing and the related task-specific cognitive skills (Rubin 1997 [1995], 15, 60–62, 196, 308–318; Pyysiäinen 1999a), as well as of advanced technology, our ancestors had no other choice than to adopt the intentional stance, i.e. "animism," in order to be able to understand and predict the behavior of nature. This does not mean that they actually believed that rivers and clouds really had intentions just like we do. Such an error would be in sharp contrast with our general knowledge of how intuitive physics and biology work in all cultures (see Boyer 1994a and b, 1996a [1995]). Yet, as we shall see, people are also capable of counterintuitive representations, and, occasionally, they attribute intentions to somehow deviant members of physical and biological taxonomies, e.g., deviant rocks, birds, etc. These are anomalies in the sense that they belong to a certain category, but they also violate some expectations concerning the characteristics of the members of such a category (Sperber 1996a). In such cases, the deviant individual or object is considered to be a manifestation of a counterintuitive reality.

In this way, the idea has emerged of a separate level of reality, inhabited by non-observable beings and not accessible to us except via such processes as "revelation," "mystical experience" (see Pyysiäinen 1998), "enlightenment," "speaking in tongues," or "shamanic journeys." Death is considered to be the natural way of gaining access to the other world, and those who have undergone so-called "near-death experiences" describe the afterlife in terms of typical, religious, counterintuitive imagery (Ritchie 1996 [1994]).

It is these beliefs in another level of reality and in corresponding

extraordinary ways of knowing that also underlie the claims, often presented in the scientific debate, that religion is a *sui generis* phenomenon. This claim holds that religion cannot be understood and explained adequately by scientific inquiry, and that it must be supplemented, if not replaced, by other ways of knowing, such as revealed theology or religious experience (see McCutcheon 1997; Wiebe 1999). Such statements naturally represent a completely different ideal of comparative religion from that endorsed here.

Both religion and science, however, take the everyday world to be a "manifestation of a hidden, underlying reality," although religion differs from science due to the former's "personalism" (Horton 1993, 347–348). The notion of agency, as developed here, nicely explains this personalism. It also helps explain the idea of a specific non-observable level of reality as a theological, or "folk theological," schematization of the beliefs concerning such non-observable agents as gods, demons, angels, etc. inhabiting other worlds (see Barrett 1999). These non-observable beings resemble humans in the sense of being agents, although they lack biological and physical properties, and thus are counterintuitive in Boyer's sense of the term.

To understand counterintuitivity, it is necessary to consider what is meant by "intuitive." Findings in developmental and cognitive psychology show that even young children have intuitive knowledge in such domains as psychology, biology, and physics, and that they are capable of providing appropriate explanations for phenomena within each domain. Children learn *spontaneously* that both they and others have a so-called mind (whatever precisely that may be), that living things are different from natural objects and artifacts, and that the behavior of solid objects is constrained by certain categorical laws (for instance, they cannot be in two places at once). Children also correctly attribute intentions only to humans and to animals, and biological functions (growth, etc.) to living kinds; they also restrict purely physical explanations to natural objects and artifacts. This constitutes *intuitive knowledge*, i.e., knowledge that is acquired without explicit tuition, on the basis of a genetically inherited competence (Atran 1990; Boyer 1994b, 1996a [1995], 1998; Mithen 1996, 50–55).

But people also are capable of counterintuitive representations, in which, for instance intentions are transferred to solid objects, or physical and biological properties are denied to a person. Religious ideas are a good example of the counterintuitiveness produced by

such transference and violation, and Boyer (1994a, 408) claims they constitute the category of "religious ideas." His empirical studies (see Boyer forthcoming) also show that counterintuitiveness creates a general "feel" for religiousness in subjects. Moreover, sufficiently counterintuitive ideas are better recalled than ordinary or overly counterintuitive ones, and thus they are also more effectively distributed (Boyer 1993a and b, 1994a and b, 1996a [1995], 1998).

However, Boyer does not claim that substantive universals exist in religion. He only mentions a few very common (though not universal) notions, such as the idea of non-observable, extra-natural agencies, the belief in a nonphysical component of persons surviving death, and the notion of special categories of persons receiving some kind of divine inspiration (Boyer 1994b, 5, 33–34). In addition, religious ideas are characterized by counterintuitive claims; by complex concepts with no one clear interpretation; and by inferential gaps, which means that people often are uncertain about the propositions that can be directly derived from statements they regard as true (Boyer 1994b, 42–49).

Boyer (1994b, 42–43) also divides the types of religious representation into four: ontological; causal; episodic; and social categorical. Applying this typology to the idea of a counterintuitive reality, we develop the following list of the most important elements of a religious representation of a non-observable, counterintuitive reality: (1) ontological representations of counterintuitive beings; (2) representations involving causal links connecting ordinary and counterintuitive beings; (3) episodic descriptions of situations in which counterintuitiveness has played a part; and (4) representations concerning differences between people in relation to counterintuitive abilities and characteristics.

These repertoires provide a good summary of what kinds of representations are needed to have an idea of a counterintuitive reality that can be used in reasoning tasks. The repertoire firstly includes representations of counterintuitive beings that can be classified into persons, natural kinds (animals and plants), and physical objects (natural objects, non-biological natural kinds like gold, and artifacts) with some counterintuitive properties (see Boyer 1994b, 91–124). Then, the ways humans can interact with these beings must be represented in the form of such causal links as "revelation," "enlightenment," etc. (Boyer 1994b, 125–154). These links are often represented in the form of narratives concerning

situations where people have come across something counterintuitive, and these narratives can then become objects of theological speculations. Theologians are one example of religious specialists who are believed to have some specific counterintuitive capacities that derive from an underlying essence, making the theologian a true member of the category of religious specialists (Boyer 1993b, 1994b, 155 184).

RELIGION AS A CATEGORY

Not all counterintuitiveness, however, is religious. It is the schematization of beliefs into a quasi theology of sorts, religious belief, and the use of counterintuitive beliefs in interpreting and organizing one's life that are essential in distinguishing religious from other instances of counterintuitiveness. Isolated counterintuitive beliefs that cannot be connected to any known tradition are usually not regarded as religious (also see Malley 1995, 7). There has to be a larger set of seriously believed ideas, in which a counterintuitive idea is embedded and within which it acquires meaning and relevance, for the idea to count as an instance of religion. This in turn requires that there is a group of people who believe such ideas to be important and worthy of being schematized and transmitted to new generations. A schizophrenic who has his or her own set of internally coherent counterintuitive ideas is not religious to the extent that his or her representations are not shared by others, and do not allow for a proper life-management.

Thus, instead of being a scientific, explanatory, category, "religion" is merely a heuristic one, used by scholars to lump together phenomena that seem to have some kind of family resemblance. As long as there is no general theory of religion, it remains a folk category in the sense that it is the prototype of the Judeo-Christian and Islamic traditions that shapes scholars' understandings of religion (Saler 1993, cf. McCutcheon 1997, vii viii).

"Religion" as a category as has been argued by such authors as Jonathan Z. Smith (1982, xi), Veikko Anttonen (1996, 36 39), and Russell McCutcheon (1997, viii) is the construct of scholars. This, however, does not mean that, by creating a category of "religion," scholars also *invented* religion (Wiebe 1994, 838; 1999, 295 n.6). Religious beliefs, behaviors, etc. do have a real existence, independent of the academy, and they are understood by people to be

distinct. It is the scholar who, by his or her comparative efforts, conceptualizes this intuitive distinctiveness as "religiousness." To the extent that the scholar is guided in this process by the specific tradition(s) with which he or she is most familiar, those traditions exercise a prototype effect on the way the scholar identifies something as an instance of religion. Therefore, as long as there is no general theory of religion, not much is explained merely by taking a representation to be an instance of religion (see Boyer 1996b, 206–208, 212; Krymkowski and Martin 1998).

A general theory of religion would require the actual existence of a separate class of phenomena referred to as "religious," which could be explained by a set of distinct laws. This is not the case if religious representations are produced by the same cognitive mechanisms that also produce non-religious representations. Religion as a universal category thus is a construct with no clear boundaries. To cite Boyer (1996b, 201), religion is an "impure subject" (in a chemical rather than a moral sense). Religious representations are not a particular type of mental representation, and "religion" does not refer to objects with distinctive causal properties. It is merely a social convention that certain counterintuitive representations, and not others, are regarded as instances of religion. The mechanisms by which this convention works can be cognitively explained, however.

The theory of agent representation, seen in an evolutionary perspective, helps us to understand the emergence of the category of "religion." It also allows us to take into consideration the fact that religious representations are used also for explanatory purposes. Putting agent representation in an evolutionary perspective, in the sense in which Varela *et al.* (1996 [1991]) understand the evolution of the human cognitive system as natural drift, means that neither the external world nor cognition is taken as a fixed given. Instead, both are viewed as co-evolving systems without any ultimate ground. On the one hand, the human cognitive system is an emergent outcome of the self-organization of matter; on the other, the cognized reality is perceived in the way that it is because evolution has shaped the human perceptual system to be such as it is. As Varela *et al.* write, "Our cognition emerges from the background of a world that extends beyond us but that cannot be found apart from our embodiment." Organism and environment enfold into each other and unfold from one another (Varela *et al.* 1996 [1991], 198–217, 231–233; also see Malley 1995, 7–8). To provide a simpler example,

the spectral sensitivity of honeybees is shifted towards the ultraviolet, and flowers have contrasting reflectance patterns in ultraviolet light. This feature of flowers was not formed before the development of the sensorimotor capacities of bees (or the other way around). To the contrary, these two characteristics have co-evolved. In this way, environmental regularities are not pre-given but they are brought forth in interaction with various kinds of cognitive systems (Varela *et al.* 1996 [1991], 201–205; Varela). According to this perspective, it is apparent that both agents and the ability to recognize agents and to adopt the intentional stance have co-evolved. Neither the human cognitive system nor the objects of the external world are pre-given, but they have been brought forth in interaction, which also means that both will continue to evolve without any predetermined goal. Therefore, there is no reason to suppose that we have a mind made up of an ideal number of modules.

Thus, because at some point of evolution we have learned that humans have minds (Mithen 1996), we have also become able to adopt the intentional stance, even in cases in which it is not literally correct. By the same token, we have developed a tendency to overextend the intentional stance to non-observable agents actually believed to exist. As Boyer (1996a [1995], 629) notes, intuitively unnatural things are considered to be definitely real. They are counterintuitive with respect to our intuitions about their subject matter, but our reflective reasons for accepting them still may seem intuitively compelling (Sperber 1994, 62). Guthrie (1993) believes that postulating the existence of camouflaged agents is a good bet because it aids survival, but if we take it merely as an unintended consequence, we also have to think, like Varela *et al.*, that adaptation may only discard those features that are a threat to survival (Kauffman 1993; Varela *et al.* 1996 [1991]). Anthropomorphism, therefore, does not necessarily have to be of great adaptive value in order to survive. As soon as beliefs concerning a counterintuitive reality become widely distributed in a population, they become part of the cultural reality in which people live, and they no longer can be ignored. Consequently, presupposed counterintuitive agents become objects of serious belief and start to influence people's lives in many ways. Purely idiosyncratic beliefs remain mere curiosities, but widely distributed ones become material for what we call *religion*.

Counterintuitive realities are, quite naturally, conceptualized in

terms of what is familiar and important for the group of people in question (Pyysiäinen 1998, 1999b), but this does not mean, as Durkheimians would have it, that the group, in the final analysis, worships itself. Belief in a counterintuitive reality cannot be explained functionally, because it is more an unintended consequence of the ability to take an intentional stance than it is based on a strict functional mechanism. Also, pointing out some function that a religious idea or practice seems to serve does not necessarily constitute an explanation for the existence of the idea or practice (Hempel 1965, 297–330; Guthrie 1993, 17–21; Whitehouse 1995, 205). It is, rather, that the members of the group believe it is important in their daily life to take into account the postulated non-observable agents; the counterintuitive reality thus begins, in many respects, to resemble the believers' own society. Different things are important in a hunter-gatherer society as compared to an agrarian society; during times of war, the gods begin to look like war-heroes, and so on.

To provide a simple example, the Pomio Kivung movement in East New Britain, in Papua New Guinea, entertains a belief according to which the self-government they await already exists on a "transcendental" plane, in the form of a "Village Government" consisting of God and a large number of ancestors. The followers of the movement anticipate the return of these ancestors, an event they refer to as the "breaking of the fence." This anticipation is characterized by an interrelatedness of millenarian and secular, or bodily and spiritual, aspects and motives. The ancestors receive regular temple offerings, meant to bring the parties closer together and to unite them in a common goal (Whitehouse 1995, 43–47, 54, 77). The fact that the counterintuitive agents are ancestors presided over by God, and expected to return and restore self-government, clearly reflects the social reality of the Pomio people. God and ancestors are counterintuitive agents, important for the well-being of the society, while the offerings form a causal link connecting the two spheres of reality. As to episodic descriptions of situations in which counterintuitiveness has played a part, the whole movement had its start when a certain Tanotka fell sick and was interpreted by his classificatory brother Baninge as being possessed by an ancestor. Within a few weeks, this experience was mythologized and became the foundation of the movement. From the follower's point of view, Tanotka's religious career is testimony to the principal difference

between various people in relation to counterintuitive abilities and characteristics (Whitehouse 1995, 90–91).

To provide another example about human relationships with counterintuitive agents, within Christianity the most important counterintuitive agents are God and the resurrected Jesus. The most cherished causal principle is the faith by which people are connected to the counterintuitive reality, and the most important object of faith is the episodic description of the death and resurrection of Jesus. Faith also is the defining characteristic in the division between those who shall inherit an eternal life (a counterintuitive property) and those who shall not. In Lutheran theology, this division has taken the form of a distinction between the worldly, visible Church (*ecclesia visibilis*), which is a *corpus permixtum* consisting of real and false believers, and the invisible, or hidden, Church (*ecclesia invisibilis/abscondita*), consisting only of those with real faith. In the second case, invisibility means that we humans cannot know who really has faith (see Härle 1989, 287–288).

EMOTION AND MEMORY IN RELIGION

In these examples, religious experience and emotion play an important role in the episodic descriptions of an encounter with something counterintuitive. But, because widely distributed oral reports concerning counterintuitive experiences are always highly schematized formal accounts (Rubin 1997 [1995], 22–37), we should not expect them to be faithful accounts of what somebody actually has felt and experienced. Here, Sperber's approach has much to offer for a critical analysis of such reports. This does not mean, however, that there are no emotions or experiences in the background of memorates and the legends into which they turn (Honko 1964), only that we usually are unable to unravel them. But when it comes to the way such reports are transmitted and distributed, taking the emotional aspect into account is essential because the "mysteriousness" (counterintuitiveness, evocativeness) that makes religious representations "addictive" relates to emotions. In other words, when an episodic representation of a situation in which counterintuitiveness has played a part is recalled and transmitted, it tends to arouse emotions of fear, or of joy and relief (see Burkert 1996, 29–33; Whitehouse 1995, 151–152).

Joy and relief belong to religious experience because, by proper

means, the terrifying counterintuitive agents and forces supposedly can be manipulated to work for the benefit of humans, as in our examples of the Pomio Kivung (offerings) and Christianity (faith). Becoming convinced that one really has managed to manipulate the counterintuitive agents and forces means becoming convinced that one no longer has anything to fear, which can result in extreme experiences of joy, as, e.g., in the so-called "Laughing Revival" or "Toronto Blessing" (see Poloma 1997). Psychologically this is a quite similar reaction to the one involved in seeing an especially big and muscular man: as long as he is a stranger he may appear as threatening and scary, but if he happens to be one's friend he is felt as safe company on dark streets (see Pyysiäinen forthcoming). Counterintuitiveness produces these effects because it is a threat to our capacity for cognitive control over the world.

There are various theories of emotion, ranging from neurophysiological to social constructivist (see LeDoux 1998, 42–72, 112–121; Griffiths 1997). To begin with, we should distinguish between emotions as phylogenetically ancient, informationally encapsulated, reflex-like responses that are insensitive to culture; feelings of emotions as aspects of higher cognition, which differ across cultures due to the roles culture plays in psychological development; and thirdly what Damasio calls background feelings, i.e. feelings that correspond to the body state prevailing between emotions. For Damasio, emotions are defined by bodily changes, while feelings are either consciously experienced emotions or background feelings. Feelings thus understood are sensors for the match or lack of match between an organism and its environment. The most universal emotions are happiness, sadness, anger, fear, and disgust, which all correspond to preorganized bodily states. Paul Griffiths (1997, 102–104), however, suggests that Damasio has presented no evidence for his assumption that secondary emotions always involve the activation of primary emotions. Thus there may also be spontaneous emotions (or, feelings) that vary across cultures. (Damasio 1996 [1994], 132–133, 139, 143–145, 149–151; Damasio 1999, 35–81, 283–286; Griffiths 1997; see Pyysiäinen forthcoming).

By primary emotions Damasio means emotions that are hardwired tendencies to react to stimuli with emotion in a preorganized fashion. Among such stimuli is for example big size (e.g. large animals). Such emotions emerge when early sensory cortices detect and categorize certain feature(s) of stimuli, and structures such as the

amygdala receive signals about them. This may then be accompanied by a conscious feeling of fear, which provides one with more flexibility of response based on one's previous experiences stored in memory. Secondary emotions occur when networks in the prefrontal cortex automatically and involuntarily respond to signals arising from conscious and deliberate manipulation of mental images (Damasio 1996 [1994], 131–142).

As to the way emotion enhances memory, experimental evidence shows that the release of adrenaline in fearful situations helps one remember the situation vividly ("flashbulb memories"), whereas adrenaline blockade is a hindrance to memory. There seems to be a mechanism whereby the released adrenaline returns to the brain and influences the functioning of the temporal lobe memory system, strengthening the memories that have been created there. Such memories, however, are not necessarily precise, since the memory improvement affects certain aspects more than others. Extremely traumatic emotional events also may prevent recall completely, although the mechanism of this is not yet understood (LeDoux 1998 [1996], 206–211; cf. Neisser 1982; Winograd and Neisser 1992; see McCauley).

There are, however, two memory systems: one that forms memories available for conscious recollection at some later time (explicit memory); and another that operates outside of consciousness (implicit memory). Imagine, for example, that one has been in a car accident in which the horn of one's car got stuck. Later, when one hears a horn similarly stuck, the neural representation of the sound, having become a conditioned fear stimulus, goes straight from the auditory system to the amygdala and elicits bodily responses that constitute an emotion of fear. This is an unconscious memory. But the sound also goes through the cortex to the temporal lobe memory system, in which explicit memories are activated. This causes one to remember the accident consciously. Such conscious memories are mere cold facts of the variety "I had a terrible accident," without any emotional consequences. It is the implicit fear memory system that provides the emotional reaction that accompanies the conscious memory. One remembers the accident consciously and feels bad (LeDoux 1998 [1996], 181, 196–201).

It is also possible that one will have only an implicit, unconscious memory of the horn being stuck. In that case, one will react emotionally to the sound of a horn without knowing why, because

the memory of the sound has been wiped out of conscious memory. In fact, the implicit memory system really is less forgetful than the explicit one, to the extent that conditioned fear responses tend to be practically permanent once established, thus making it quite common to have implicit memories without explicit ones (LeDoux 1998 [1996], 153–174, 203–204).

The implicit memory system also is much faster than the explicit one. In a rat, it takes about twelve milliseconds for an acoustic stimulus to reach the amygdala via the thalamic pathway, while it takes twice as long to travel the cortical pathway through which explicit memories are processed. Thus, for example, if one is walking in the woods and hears a strange sound in the grass, it goes straight to the amygdala and prepares one for defense against a snake. Only later does the sound go from the thalamus to the cortex, where it is interpreted as actually coming from a rattlesnake. It could, equally well, turn out to be merely the wind playing in the long grass. But it is better to mistake the wind for a snake than vice versa (LeDoux 1998 [1996], 153, 163–165; see Guthrie).

When religious ideas are transmitted in situations in which emotions of fear (or of joy) dominate, the ideas learned will be vividly recalled, and whenever they are encountered afterwards, the reaction of fear (or of joy) will ensue, consciously or unconsciously. In this way, emotion both helps keep the ideas alive, and the cultivation of the ideas causes the emotional reaction to recur. Sperber's epidemiology of beliefs may work quite well when we are dealing with explicit memories, but with implicit memories, it falls short. If fear conditioning creates (near) permanent connections between ideas and perceptions, the persistence of religious ideas and attitudes has one rather plausible explanation.

To provide an example, the Pomio Kivung and its splinter group have two strategies for preserving the ideology unchanged and for sustaining unity: frequent mechanical repetition of the doctrine; and occasional emotional outbursts in the splinter group. In the absence of literacy, continual sermonizing was the essential means of ensuring that the doctrine was understood and could be kept in memory as a logically coherent whole (Whitehouse 1995, 174, 183–184; cf. Rubin 1997 [1995]). Whitehouse explains this by distinguishing between a "doctrinal" mode of religiosity, based on verbal language and logical coherence, and an "imagistic mode," based on non-verbal imagery. It is only the imagery that receives its

persuasiveness from emotional and sensual stimulation (Whitehouse 1995, 191–221).

Whitehouse does not, however, consider the mainstream institutions sufficient to account for the enduring popularity of the movement. Paradoxically, the main stimulus for renewed commitment came from temporary attempts to break away and perform isolated climactic rituals to produce the millennium. In such rituals, compelling and moving images of eschatological themes were cultivated in an emotional atmosphere of fear and mystery. Such emotional outbursts enriched and deepened people's experience of orthodox practice and created enduring solidarity. The religious experiences of the participants produced "revelations," which were capable of being sustained long after the rituals had ceased (Whitehouse 1995, 150–152, 174–185). But, according to Whitehouse (1995, 4–5), these were unintended consequences of the climactic rituals, which did not entail any functionalist interpretation. One could say that representations transmitted in emotional contexts tend to survive quite irrespective of whether that was the explicit intention of the believers.

To sum up, counterintuitive ideas are an inevitable outcome of our cognitive evolution, and perhaps they even can be said to form an independent domain or module, the input into which is conceptual and counterintuitive (see Sperber 1994; Hirschfeld and Gelman 1994a; Mithen 1996). Once counterintuitive ideas exist, we have to do something for them (or, with them), and what is known as "religion" is one way of treating them so that a certain amount of coherence and organization is introduced in both minds and society (cf. McNamara). This, however, neither entails that religion only has positive effects, nor that it has a simple functional explanation. Dealing with religious counterintuitive ideas gives rise to strong emotions when one's attitude is religious, i.e. one believes that those representations have objective referents in a counterintuitive reality. The so-called "mystical" experiences may be a special case of religious experiences, dominated by a specific temporal lobe circuitry (Persinger 1987; Ramachandran and Blakeslee 1999 [1998], 174–188), and explaining their connection with other types of religious experience is an important task for future research (cf. McNamara). Emotions thus form the basis of what is known as "religious experience" and "religious belief." This specific psychological mode serves to distinguish religious counterintuitiveness from

other types of counterintuitiveness in the sense that religious representations are objects of an almost unshakeable belief, due to the emotional attitude towards them one has developed by fear conditioning. Belief also enhances the recall and transmission of religious ideas because religiously believed ideas are taken very seriously, and an emotional reaction enhances memory also on a purely physiological basis. It is thus important to realize that religiousness is not an intrinsic property of representations as such, but relates to the emotional use to which the representations are put. In principle almost any ideas can become selected for religious use, but this necessitates, among other things, that they are somehow related to other ideas which are about emotion-provoking counterintuitive agents (cf. Lawson and McCauley 1990).

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CHAPTER 4

Why gods? A cognitive theory

Stewart Guthrie

> We find human faces in the moon, armies in the clouds; and by a natural propensity . . . ascribe malice or good-will to every thing, that hurts or pleases us. Hence . . . trees, mountains and streams are personified, and the inanimate parts of nature acquire sentiment and passion.
>
> David Hume, *The Natural History of Religion*, p. 29

A classical cognitive approach to religion holds that beliefs in gods, modeled on human self-understandings, arise and persist because they provide intelligible and plausible interpretations of the world. Advocates of this approach, however, have not explained convincingly why humans model the world so heavily on themselves rather than on something else. I argue that our tendency to view and treat the world as alive and humanlike — that is, to animate and anthropomorphize it — constitutes a necessary and deeply held cognitive bias. The bias stems from an innate strategy: to interpret ambiguous things and events first as what matters most. What matters most usually is what is alive and especially what is human. We readily see and hear our environments as alive and humanlike because when they actually are, we benefit from such interpretation, and when they are not, we lose little. Consequently gods, demons, and the like are part of a spectrum of humanlike beings we think we discern in the world.

INTERPRETING THE WORLD

In joining cognitive science and religious experience, the authors in this volume largely are viewing religion as a kind of cognition — that is, as a kind of interpretation of the world. We are saying what sort of interpretation religion is, and why such an interpretation takes place. I believe that religion is a form of interpretation and

corresponding action that credits the world with various humanlike but nonhuman beings, i.e., with gods and their relatives. As such, religion is only one aspect of a widespread human view of the world as animate and humanlike, a view that is broad, deep, and varied. Religion also is an aspect of a still broader animal tendency to see the world as animate.

But why does this tendency occur? Although a range of answers has been suggested, none has been broadly persuasive. In the view advanced here and elsewhere (Guthrie 1980, 1993, 1997a and b), our tendency to overestimate animacy and humanity in the world constitutes a cognitive default. Contrary to Sperber (1996), this default and the specific mechanisms that produce it are, I have argued, part of a broad cognitive and perceptual strategy: that is, to interpret the world's ambiguities first as those possibilities that matter most. Such real possibilities include living things, especially humans. Thus we see shadows as persons and hear sounds as signals, because if these interpretations are right, they are invaluable, and if they are wrong, they are relatively harmless. Gods are only the most prominent of a spectrum of possible humanlike beings and effects that we think we discern in the world.

I emphasize that these beings and effects appear "possible" because, as Gazzaniga (1998) notes, the brain sees possible figures, e.g., in graphic representations, more quickly and more accurately than it sees impossible ones. It is not primed to see impossible objects. Although cognition and perception both involve interpretation and thus construction, we are not equally adept at constructing all objects. Hence the objects that we tend to perceive are plausible ones, those that might, in fact, exist. The near universality of such concepts as gods, spirits, demons, and the like suggests, then, that they appear to us intuitively as possible objects (cf. Pinker 1998, cited in Andresen "Towards a Cognitive Science"; also see Lawson, Saler, and Pyyssiäinen, who think such concepts are counterintuitive). My project here is to show why these concepts are intuitive.

First, however, I wish to acknowledge that there are objections to identifying religion with gods. Three of these are especially salient. The first may be called the ethnocentrism objection. It points out that the concept of religion is the product of a particular time and place. As Derrida (1998, 36) writes, "the history of the word 'religion' should in principle forbid every non-Christian from using the name

'religion.'" When applied cross-culturally, the concept encounters inconsistencies, such as systems that resemble religions but have no gods. The standard example (given, e.g., by Lawson, Varela) of such a godless religion is Buddhism.

To this objection, one may reply that indeed, "religion" *is* a Western folk term, but it is not incurably culture-bound. The real question is whether a given term is theoretically coherent enough for cross-cultural travel, and I think that the notion of religion with gods is. This position still is common sense for most Westerners. For instance, Gargani (1998, 112) recently asked, "How can one speak of religion without somehow committing oneself to some thesis regarding the existence of God?" More specifically, the example of Buddhism is illusory, since most Buddhism is well supplied with gods. Moreover, godless versions of Buddhism are no more problematic for my approach than are demythologized Christianity or ethnic Judaism. Such Buddhism is better termed Buddhist philosophy, just as the latter two "religions" are better called Christian ethics and Jewish culture. All these phenomena are situated on a continuum with their more religious congeners.

A second objection may be called anti-essentialism. This position, in the form of the family-resemblance alternative advanced by Saler (1993), solves the problem of culture-boundness by dissolving religion into a set of components. We should not expect, this position's proponents say, to find all these components in everything we call religion. Qualification as "religion" is a matter not of either/or, but of more or less. For example, Marxism may be somewhat religious, despite its avowed atheism. Similarly, Gadamer (1998, 201–202) recently has written both of the "compulsory state religion of the Soviet Union" and of a "religion of the world economy." Especially valuable in the anti-essentialist approach is the view that religion is a concept we apply to aspects of a continuum of human thought and action. As Pyysiäinen remarks in his chapter in this volume, it is a "construct with no clear boundaries." Indeed, its borders are indistinct not contingently but intrinsically. However, it does seem to me that if religions have family resemblances, then we should pursue the metaphor and ask, who are the family progenitors? I suggest that these progenitors are our perceptual uncertainty and our need to detect human presences wherever they may exist.

The third objection to understanding religion as involvement with

gods is the religion-as-*sui generis* view. Historically associated first with Schleiermacher and later with Otto and Eliade, this, too, appears in part as a response to the ethnocentrism problem. Schleiermacher (1988) declared that religion transcends differences in culture and worldview because its essence is neither beliefs nor practices, but rather a private experience: a feeling or emotion towards an unspecified and unspecifiable Other. Religious experience, unlike other experiences, supposedly is direct and unmediated by culture or by other influences. This view now is widespread among religious studies scholars (McCutcheon 1997) and others in Western societies, where such experience often is called (e.g., Varela) "spiritual."

One problem with the notion of religion as private experience, however, is that such experience is, by definition, subjective and inaccessible; hence, it is unalterably vague. (Its vagueness is noted by Pyysiäinen, as well.) Either one has had such an experience, or one has not. But how is one to know? As Sharf (1998) notes, someone else's experience may or may not be the same; it remains hermetically sealed. In an attempt to overcome what he admits is such vagueness, Derrida (1998, 33) says that what we call religion is not one experience but the convergence of two experiences: "the experience of *belief* [and] the experience of the unscathed, of *sacredness* or of *holiness*." Derrida's move is of little help, however, since the two terms he invokes are at least as obscure as the one he wishes to define (as Saler on belief and Guthrie 1996 on the sacred suggest).

Two sorts of analyses further undermine the claim that religion is an unmediated, hence *sui generis*, experience. Proudfoot (1985) denies that *any* experience can be unmediated, pointing out that people have feelings not towards unspecified objects, but only towards objects to which they attribute certain qualities. We do not experience love, awe, or dependency towards nothing in particular, or towards something merely "numinous," but towards something we credit with loveableness, awesomeness, or superiority. Thus, one's experience depends upon one's interpretation of what has been encountered. The feelings that Schleiermacher claims are unmediated already are shaped by some conception of what they are directed towards.

By examining, among other things, its historical construction not least by persons and professions seeking to privilege religion

McCutcheon (1997) and Sharf (1995, 1998) also have undermined the *sui generis* claim. The history of this construction, moreover, has little depth. Wiebe (2000) joins McCutcheon and Sharf in noting that it is only recently that Christian theologians have backed away from ontology in favor of experience.

THE RISE AND PERSISTENCE OF RELIGIOUS INTERPRETATIONS

If, then, religion may be construed as interpretations of, and actions towards, the world in terms of gods, demons, angels, and other humanlike beings, the central questions for cognitive science are, how do such interpretations arise and why do they persist? Here I endorse Kamppinen, who notes that the cognitive approach assumes that religious phenomena are generated by ordinary cognitive mechanisms and that religious cognition and action do not differ from other modes of human cognition and action. Indeed, in my view, they do not constitute a mode at all. This is again to maintain that religion is not *sui generis* and that it needs neither special status nor special means of study. The cognitive approach, then, is reductive, holding that religious thought and action are based on more fundamental mechanisms.

A central implication of the cognitive approach is that an understanding of religious thought and action must be based on a more general understanding of human thought and action. Understandings in cognitive science, in turn, typically are based, at least in part, on various evolutionary ideas. I wish to invoke two such ideas here. The first is the orthodox Darwinian claim that, in general, the features of an organism may be understood to serve the organism's needs in its native environment and to have arisen by selection for such service.

A second, more recent idea partially qualifies the first. Gould (1991) notes that, in a given environment, the advantage of any given feature may be merely accidental, since features always are products of earlier environments. Because such a feature stems from earlier conditions rather than changing towards later ones, Gould proposes that it be called not an adaptation but an "exaptation." Thus, the pelvic and pectoral fins of a fish may pre-adapt, or exapt, it for crawling on land, and we cannot account for the presence of these fins by their usefulness in their new environment. Moreover, a feature may confer no advantage at all, yet it still may

persist as a by-product of features that do confer one. In either case, one would be mistaken to explain the feature's existence by its advantage.

Religion, in my view, exemplifies these evolutionary ideas. While religion may be put to any number of uses, e.g., providing existential meaning, denying death, and enforcing morality, it did not *arise* as a result of any of these uses; instead, it arose as a result of an earlier tendency to overevaluate ambiguous phenomena in particular ways. More specifically, in the face of uncertainty, we judge the inanimate to be alive and the nonhuman to be human. We do so, as I argue, because this tendency has been highly useful, indeed necessary, and thus it has been enforced by natural selection. It has been useful, in brief, because it is better to mistake something unimportant for something important   a stick for a snake, say   than the other way around. That is, humans and other animals are geared to look for what affects their interests. Religion itself has no single use (or misuse), and it may or may not confer advantages on particular groups or individuals at particular times. Accordingly, as with fish fins employed in crawling on land, its existence cannot be explained by its current uses but only by its antecedent conditions.

Ideas of gods arise, then, as we scan the ambiguous things and events of the world (e.g., its fleeting shadows and thumps in the night, its earthquakes and plagues) for features and patterns of what most affects us. What usually most affects us, because of their unparalleled complexity and power among other reasons, is our fellow humans; so we are keyed to look for patterns resembling our own. We do this involuntarily and unconsciously, and for reasons that are not in themselves religious.

Religious interpretations thus are those that discover humanlike patterns in the nonhuman world. Crucially, they discover those patterns that appear to constitute human patterns of behavior, such as planning and symbolic communication. Gods may or may not have white beards or other physical features, but they do have the capacities to plan and to communicate symbolically, which are key human characteristics. My claims, then, are first that religion is anthropomorphism (the attribution of human characteristics to the nonhuman world); and second, that such attribution is peculiarly intuitive   that is, spontaneous and independent of external tuition.

PRIOR COGNITIVE ACCOUNTS OF ANTHROPOMORPHISM AND ANIMISM

In claiming that religion anthropomorphizes and animates, I have a long line of predecessors, stretching back to Xenophanes (if lions and horses could draw and sculpt, their gods would look like lions and horses) and on to Spinoza, Hume, Feuerbach, Tylor, and Freud, among others. However, in explaining why religion does so, my predecessors break ranks, and none has offered a broadly convincing answer. Their explanations range from cognitivist to emotionalist.

The first well-developed cognitive account is Hume's (1957 [1757]). Hume sets us in a mysterious and fearsome world where, failing to understand the events around us, we resort to models with which we are most "familiarly acquainted, and of which [we] are intimately conscious," i.e., models of ourselves. Thus religion is an attempt to interpret and explain the world in the face of pressing uncertainty.

Most writers since Hume have subordinated cognition to other considerations. Feuerbach, for instance, claims that we create God in our image because, trapped by death and other existential limitations, we desire to be rescued (Feuerbach 1972; Harvey 1995). Freud (1964 [1927]) offers a variant of this thesis with his claim that we wish to recapture the parental protection we had as children. Similar wishful-thinking explanations have been offered by anthropologists (Spiro 1966; Wallace 1966; La Barre 1972 [1970]), psychologists (Reik 1951; Jones 1951), and sociologists (Stark and Bainbridge 1987), among others. Recently, however, a cognitivist resurgence has included anthropologists (Horton 1993; Boyer 1994); religionists and philosophers (Lawson and McCauley 1990; Lawson; McCauley) and psychologists (Barrett and Keil 1996; Barrett). These cognitivists all note, in some degree, the anthropomorphism of religion. For example, Barrett points out that most cognitive accounts of childhood religion say that children think of gods merely as special, usually big, persons, and Lawson and McCauley (1990 and, independently, this volume) make the idea of humanlike agency central to religion.

Although skeptics of religion claim that anthropomorphism is central to it, theologians are more persuasive witnesses. Their credibility is enhanced by their reluctance. Virtually all admit unhappily (Ferré 1984) that there is no religion that does not anthropomorphize. Nonetheless, even though theologians and many

skeptics agree that there is no religion without it, explanations of anthropomorphism remain diverse and unsatisfactory (Humphrey 1976; Caporael 1986; Boyer 1996; Mitchell, Thompson, and Miles 1997).

The lack of a good analysis of anthropomorphism owes much to the two standard explanations given for it. I call these two explanations, sometimes given also for animism, the comfort and the familiarity theories (Guthrie 1993, 1997a and b). Each contains an element of truth, but neither is satisfactory. The familiarity theory is primarily cognitive. It holds that we need models of the world and that we extend our self-models to it. In its usual, intellectualist form, held by Hume, and, evidently, by Lawson and Barrett, and by Lancaster (2000), this theory assumes that we know ourselves especially well. Thus, in Lawson's terms, it is "easier and more efficient" to explain an event by assuming human agency than by finding the real but hidden causes. However, as Freud has said of our psyches, and as is just as true of our bodies (witness the relative newness of such basic discoveries as the circulation of blood), we do not know ourselves so well at all no better, anyway, than we know many other things such as dogs, or rivers, or house plants. Yet we see the world as humanlike far more than we see it as doglike, riverlike, or plantlike. In a less-intellectualist form, the familiarity theory suggests that we confuse self and not-self. But in fact, such a confusion appears rare, even in young infants (Stern 1985, 10).

In contrast to the familiarity theory, the comfort theory, held for example by Feuerbach and Freud, claims that anthropomorphism makes the world seem warm and friendly, and thus is wishful thinking. Yet anthropomorphism is not always friendly, just as real humans are not. If we are alone in the house on a windy night and a door slams, we do not think, "Oh, how nice company." When anthropomorphism is frightening, we hardly can call on comfort to explain it. Thus the question remains, *why* we draw upon ourselves to construct humanlike but nonhuman others from Zeus to gremlins and from the Sun Goddess to abominable snowmen.

ANTHROPOMORPHISM AND ANIMISN AS GENERAL IN PERCEPTION AND COGNITION

Theories of religion as anthropomorphism so far have failed largely because they fail to consider anthropomorphism in general. This is

crucial because anthropomorphism *is* general, spanning all cultures and all domains (Thompson 1955 [1932]; Mitchell, Thompson, and Miles 1997). It occurs spontaneously and regularly in the unconsidered experience of daily life, for instance when we hear a branch tapping at a window as someone attracting our attention, see a full garbage sack in an alley as a lurking figure, or look at a car from behind and see its headrests as the heads of occupants.

Anthropomorphism also occurs in the deliberate productions of the arts and sciences. In the sciences, it is anathema; yet as Nietzsche (1966, 316) writes, even scientists wrestle "for an understanding of the world as a humanlike thing." Indeed, they do so commonly (Liebert 1909; Kennedy 1992; Mitchell, Thompson, and Miles 1997). Striking examples include Darwin's view of Nature as a stockbreeder (Young 1985); Lovelock's (1987) view of the Earth as Gaia, a living organism; and the "anthropic principle" of some physicists the idea that because a large number of physical properties of the universe must be just as they are in order for humans to exist, the existence of those properties, and of humans, can be no accident (Earman 1987).

In the arts, anthropomorphism begins at least as early as Homer, with spears "thirsting for blood," but it is by no means archaic. Rather, it permeates the arts, including commercial ones, as much as ever. Here, as elsewhere, it is continuous with animism (the attribution of characteristics of life to the non-living) even though the latter usually is attributed only to children and to people in gathering-and-hunting or horticultural societies. Both are alive and well in industrial society, witness popular and commercial art ranging from the dancing California Raisins, to cars wearing sunglasses, to the recent movies *Antz* and *A Bug's Life*.

This material, like much other art, combines human and nonhuman categories not spontaneously but self-consciously. But such art is only the tip of a cognitive iceberg, seen in the wake of conscious experience. It is a tiny fraction of an obscure whole, held up to the light of retrospect. Artists, like all of us, must first encounter anthropomorphism before using it. This encounter is involuntary. It consists not in mixing cognitive categories, but in applying a template from one category to an ambiguity we later decide belongs to a different category. First we see an ambiguous shape in an alley as a person; then we think, "Oh! That's only a garbage can." It is only when we make this after-the-fact distinction that we speak of

anthropomorphism. What powers religion, and what requires explanation, is this spontaneous tendency, not only in art but in all of life.

Scanning for signs of life, including signs of communication, begins early and appears intuitive and generalized. Carey and Spelke (1994, 176) note that infants "respond to objects that lack any clearly animate features (e.g., mobiles) as animate and social beings, if the behavior of those objects approximates the behavior of a responsive social agent." In a manner that parallels the Buddhist notion of *karma*, older children blame "illness on the victim himself or herself, rather than allow that it happened randomly, an explanation known as 'immanent justice'" (Gelman, Coley, and Gottfried 1994, 345). Such interpretations apparently correspond to preconceptions that are early and powerful.

Animism is closely related to anthropomorphism and is equally widespread. Animism first was investigated experimentally by Piaget (1929), who found it universal among young children. Piaget's finding has been broadly replicated and, as Barrett notes in this volume, the dominant psychology of religion regarding concept development still is Piagetian. "A long tradition of work on animism shows that children extend psychological explanations to . . . rivers, clouds, and so forth" (Harris 1994, 308).

Other studies (Sheehan, Papalia-Finlay, and Hooper 1980–1981) find animism not only among children, but also among people of all ages. In addition to humans, nonhuman animals also seem to display animism. Birds peck at twigs resembling caterpillars (Hinton 1973), coyotes pounce on sticks resembling grasshoppers (Bekoff 1989), caribou avoid rockpiles resembling Inuit (American Museum of Natural History display), and chimpanzees direct threats against thunderstorms (Goodall 1992, 1994).

PERCEPTION AS INTERPRETATION

Thus a particular systematic illusion—that what is not alive is alive—seems to link our perceptions with those of other animals. Those animals share with us what Lawson calls our predisposition to perceive agents. Any explanation encompassing both animism and anthropomorphism, then, needs a base in a comparative psychology that is informed by evolution. The explanation should delineate our needs and interests and how these influence the way we see the

world. Our broadest cognitive need is to distinguish aspects of the environment, one from another. Especially important, and especially difficult, is distinguishing the living from the non-living.

This task returns us to Hume's world of ambiguity, full of unknown causes and uncatalogued effects. Here we often think we perceive living things and especially other humans, but we are mistaken. Such mistakes occur for three linked reasons: perception is interpretation; interpretation aims at significance; and the most significant possibilities usually are alive and humanlike.

Perception is interpretation because any given stimulus may have any of a number of causes. A light in the sky may be a glint from an airplane or a reflection in our windshield; a thin dark line across a book page may be a pencil mark or a fallen hair; and a tickling on our ankle may be a loose thread or a spider. Perception, then, consists in choosing a pattern to impose on data. As Wittgenstein somewhere remarks, we never "just see"; instead, we always "see as." As Gombrich (1973) puts it, perception is betting. Indeed, our perceptual world is riven with uncertainty, though most of this is resolved before it reaches consciousness (Kahneman and Tversky 1982). As Kamppinen notes in this volume, citing Husserl, the "objects of perceptions . . . appear in one-sided adumbrations . . . For example, when I see a building, I see only its facade." That is, we are given only a facet of an object at any one moment. Even this facet is broken by shadows, reflections, and other interferences, so our sense of direct and whole perception really results from interpretation and integration.

The uncertainty inherent in all perception is exacerbated by deception, both in humans and in other animals. Almost all animals are either predator or prey to other animals, and selection for this relationship has given them an immense repertoire of deceptions including camouflage and mimicry (Hinton 1973). Animals match their backgrounds in color and apparent texture in myriad ways. We think we know animal camouflage from the browns and greens of terrestrial animals, but we are surprised by animals such as praying mantises that inhabit violet or peach-colored blossoms and are colored as they are. Often animals change color with the seasons, and some (including some squids, octopi, and insects) change color almost instantaneously as they move from one environment to another. Most animals also are counter-shaded (darker above and lighter below), preventing the revelation of volume by differential

reflection (brighter above and darker below) of light from the sky or sun. Some animals (for example, some fishes, jellyfishes, and shrimps) are nearly transparent. As a result, most animals and some plants are, until they move, virtually invisible in their environments. For this and other reasons, the living and the non-living are hard to tell apart. Indeed, Varela says, in this volume, "major scientific developments break down the traditional opposition between matter and life."

Practical intangibility also is presented by animals in schools, flocks, and herds, which frustrate easy predation by the indeterminacy of their form and location. Other historically invisible and intangible agents include bacteria and viruses. Humans as well often keep themselves invisible and intangible, by concealment and by working behind the scenes. Hence, our feeling that there are hidden agents lurking about is not only intuitive but also well founded. The frequent (though by no means universal) invisibility and intangibility of gods hardly are unusual in living beings. Rather, they are part of the standard repertoire of behavior in the natural world. Like the daughter mentioned by Lancaster (2000), we can suspect, justifiably, that God is under the carpet. This perceptual situation also accounts for the commonly experienced sense of presence (for example, the presence of Christ) noted by Wiebe (2000) and Persinger (1989a, cited in Andresen "Religion in the flesh"). It thus explains (as noted in Guthrie 1993, especially chapter 2) why we so readily attribute agency to a world we do not see, as well as to the one we do see. That is, we readily imagine that the events of the visible world earthquakes and floods, rainbows and new life are produced by actors behind the scenes.

Moreover, our intuitions apparently are shared by other animals. Ethologists and primatologists have reported a range of behaviors in animals that reveal mistaken judgments that an agent is present: animals mistake twigs for grasshoppers, garden hoses for snakes, and so on. The animal behavior most intriguing for our cognitive approach to religion is the threats that Jane Goodall (1992) and others report wild chimpanzees often direct against storms. Hating rainstorms, which chill them and promote pneumonia, the chimpanzees occasionally respond to them with the same blustering behavior they use to intimidate both other chimpanzees and other species: rushing about, they shake tree branches vigorously in a show of force. Goodall suggests that this behavior may be analogous to early

religion. It seems possible that, because chimpanzees themselves intimidate by noise and shaking branches, they infer hidden antagonists behind the noise and branch shaking of storms.

WHAT MATTERS MOST

Selecting our interpretations of our environments — our perceptual bets on what it is we are seeing — we choose neither randomly nor by probability. Instead, we choose by significance. Thus we interpret stimuli as their most important possibility. We do so for good reason. We suspect the tickle of being a spider and the dark shape in an alley of being a miscreant. The principle is that of Pascal's Wager — if these interpretations are mistaken, as they frequently are, we lose little; and if they are correct, we gain a great deal. To repeat, then, both anthropomorphism and animism are consequences of an evolved strategy of perception: to interpret the world's ambiguities first as those possibilities that matter most.

What usually matters most, and thus usually is at the top of our betting hierarchy, is what is alive (and thus often moves or is bilaterally symmetrical), and especially what is also complex (and thus often has paired eyes) and sociable. I have discussed the cognitive mechanisms involved elsewhere (e.g., 1993). Here I simply note that animals including ourselves apparently are hard-wired to perceive such features with perceptual schemata for eyes and faces (Morton and Johnson 1991), and for relations with the owners of these eyes and faces (Cosmides and Tooby 1994). According to ethologists, vertebrates including birds (Scaife 1976), iguanas (Burger *et al.* 1991), domestic chickens (Gallup 1971), garter snakes (Bern and Herzog 1994), and larval fish (Miklosi *et al.* 1995) are sensitive to eye-like displays.

Further evidence that various animals are sensitive to anything resembling eyes is provided indirectly by the many species of animals (including insects, birds, mammals, and especially fishes), the defensive coloration of which makes their eyes hard to detect or presents misleading false eye-spots (usually at the other end of the body) or both. Presumably this sensitivity reflects both the relatively high organization and corresponding potency of animals that have eyes with pupils and the difficulty of camouflaging such eyes. This sensitivity, together with sensitivity to faces and movements, is involuntary and mostly unconscious. Gombrich (1969, 103) remarks,

"when anything remotely facelike enters our field of vision, we are alerted and respond." Humans also are alerted by anything potentially purposive or message-like.

Confronting chronic ambiguity, we and other animals find the most meaningful patterns we can. The process of discovery is active, creative, and flexible. The mind, Gazzaniga said, is a hyperactive meaning-maker. Kovach (1998) notes that our recognition of pattern tolerates a high degree of variation or mutilation. And in Newberg's (2000) terms, our brain's causal operator and holistic operator are always at work. In the absence of evidence, the brain nonetheless postulates causality. Moreover, by assembling independent facts it postulates some whole whether gods, Gaia, or comprehensive causality.

The intuitive perceptual strategy I have described helps account not only for institutional religion but also for many of the phenomena collectively called "mystical." Although we often think of mysticism, as Lancaster (2000) notes, as "contentless" or simply as a "union," most mystical writings concern understanding processes through modeling them, mapping a realm one knows onto an unknown one. This results, according to Lancaster, in anthropomorphizing or animating the unknown world. The process of language mysticism, for example, deconstructs the "I" of the self and reconstructs it on a larger scale, as the "I" of God.

We and other animals all are predisposed, then, to see ambiguous phenomena as alive. In our own case, we also are disposed to see them as humanlike. Occasionally we are right, and these instances justify the strategy. Often we are mistaken, and if we later see this, we call the mistakes animism or anthropomorphism. To the extent that we do not see it, the resulting world appears more alive, and more humanlike, than it really is. It seems full of purpose, design, and various humanlike but nonhuman beings. In such a world are situated the thought and action we call religion.

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PART II

Questioning the "representation" of religious ritual action

CHAPTER 5

Ritual, memory, and emotion: comparing two cognitive hypotheses

Robert N. McCauley

Without *systems* of public, external symbols for recording information, nonliterate communities have to rely on human memory for the retention and transmission of cultural knowledge. Religious expressions either evolved in directions that rendered them memorable or they were quite literally forgotten. Most religious systems, including all of the great world religions, emerged among populations that were mostly illiterate (even if there was a literate elite). Thus, it should come as no surprise that religious systems and ritual systems, in particular, have evolved so as to exploit variables that facilitate memory. The empirical evidence suggests that the invention of literacy may sometimes ameliorate these variables' influence; however, the availability of such cultural tools neither eliminates that influence nor even surmounts it. The cognitive dynamics at stake are not only pervasive, they are also far older and far more fundamental to the persistence of religion than these comparatively recent cultural overlays. The rituals of the literate exhibit the same patterns and general trends as those of the nonliterate.

Experimental psychologists have clarified variables that contribute to extraordinary recall for events that arise in the normal course of life. Probably, the most obvious is frequency. Experiencing events of the same type frequently aids memory for that *type* of event, though not necessarily for the details of any of the particular instances of that type. When Jains carry out the Pūja ritual day after day, they become adept at its performance. Although they are fluent with the ritual's details, it is possible that they do not remember even one of their previous performances *distinctively*.

With some religious rituals, some or all of the participants may change from one performance to the next, and some rituals occur quite infrequently. (Investitures of particularly long-lived religious leaders who serve for life come to mind.) So, considerations of

frequency cannot explain memory for and, hence, transmission of all religious rituals.

Elsewhere (McCauley 1999) I have examined some of the salient variables that have emerged in the study of extraordinary recall for specific episodes and the relevance of so-called "flashbulb memories" to rituals that are performed quite infrequently. Flashbulb memories are memories for particular episodes that seem startlingly vivid and accurate, such as most older Americans' recollections about how they heard about President Kennedy's assassination (see Winograd and Neisser 1992). Some religious rituals capitalize on many of the prominent variables that contribute to extraordinary episodic memory that psychological science has uncovered. However, the crucial point for my purposes here is that they do so *differentially.*

Consider, for example, emotional stimulation, which seems particularly relevant in light of the flashbulb phenomena. Although many religious rituals are profoundly emotional experiences, not all rituals stimulate participants' emotions. In fact, some rituals are dull. Whereas some rituals incite substantial emotional excitement, others are performed so mechanically that they seem bereft of emotional power. Religious rituals vary widely on this dimension. What are the conditions that dictate which mnemonic dynamics any particular ritual exploits? For example, participants do some rituals far more frequently than others. Or, to pick up on the variable at hand, why are some rituals so emotionally stimulating, while others are so utterly routine?

Harvey Whitehouse (1992, 1995) argues, as I have, that part of the reason *why* some rituals are so emotionally provocative is to promote their memorability. Whitehouse suspects that the *frequency* of ritual performance is the critical variable that determines how much emotional stimulation any ritual involves. Rituals often performed need not incorporate means for arousing much emotion. The sheer frequency of their performance insures their retention. In contrast, rarely performed rituals stir participants' emotions, as their infrequent performance cannot insure their retention. Whitehouse advances a version of the *ritual frequency hypothesis.* Later in this chapter, I describe that hypothesis and briefly sketch Whitehouse's larger theoretical position. Whitehouse and I agree that processes of cultural transmission have rendered mnemonic considerations some of the salient reasons *why* some religious rituals incorporate more

emotionally arousing features than others. What we differ about primarily, though, is *when* religious rituals assume this garb, i.e., under what conditions rituals are likely to include high levels of emotional arousal.

Below, I show that my and Tom Lawson's (1990) theory of religious ritual competence and the account of the cognitive representation of religious rituals it contains inspire an alternative hypothesis. I defend the *ritual form hypothesis*, holding that it is participants' mostly tacit knowledge of *ritual form* rather than ritual frequency that is the critical variable determining how much emotional firepower a religious ritual possesses. I conclude this chapter by examining briefly two considerations that bear on the relative adequacy of these two competing hypotheses. I argue that in both cases, these considerations support the ritual form hypothesis over the ritual frequency hypothesis.

SENSORY PAGEANTRY, CODIFICATION, AND THE RITUAL FREQUENCY HYPOTHESIS

In various works (1989, 1992, 1995, 1996a, 1996b), Whitehouse describes his fieldwork experience among the Mali Baining of New Britain Island. The inhabitants of Dadul, the village in which he spent the first half of his fieldwork, are participants in a religious system known as the Pomio Kivung. The highly repetitive ritual system of the Pomio Kivung consists of various ritual acts, none of which participants perform any less often than once every five weeks, and the most elaborate of which they perform daily. Pomio Kivung participants' knowledge of their rituals arises exclusively from their performance *frequency*.

Local "orators" (Whitehouse 1995, 48) preside at the nine most notable meetings of the entire community that occur each week. These include twice weekly speeches at community meetings that occur during the ritual proffering of food to the ancestors. They speak on the basic tenets of Kivung faith and give standardized, fifteen-minute sermons on one of the Ten Laws, so that across any five-week period they have preached on all ten.

This only begins to hint, though, at the amount of time, energy, and resources Kivung rituals consume. Attending only these meetings requires nine hours per week from the *entire community*. This, however, would be a huge underestimation of the time that members

are either preparing for, or participating in, Kivung rituals. Whitehouse (1995, 78) counts the nine temple rituals among "the most elaborate and time-consuming activities within Kivung communities." He estimates that food preparation for these rituals alone consumes twelve person-hours per day. On a *daily* basis, they also involve maintenance and preparation of the temples, delivery of the food, "witnesses" monitoring the ancestors' activities, and cleaning up. And these are not the only Kivung rituals! The entire community also participates in fortnightly rituals in each of the two sacred gardens and also in a monthly ritual for collective absolution. Married Kivung members also perform a weekly Family Temple ritual to present food to their deceased kinsmen, while widows and widowers must do so twice per week.

Frequency is, of course, the crucial mnemonic variable the Kivung system exploits. Both the frequency with which members perform rituals and the frequency with which the orators confront Kivung believers with lengthy, largely canned speeches about the basic tenets of the faith insure that participants master Kivung cosmology, principles, and practices. Whitehouse comments that:

> the continuity of kivung religion . . . is not threatened by memory failure. The very frequent repetition of all the sacred rituals of the kivung is sufficient to ensure a high degree of standardization . . . the effect is to "drum home" every detail of the religion to the community at large. The explicit goal is to create a single, unified system of ideas within each individual. (1992, 784)

Whitehouse provides ample evidence of the detailed mastery of the Kivung system that even the lowest level participants obtain. He also underscores just how boring and monotonous all of this repetition of ritual and doctrine is: "the characteristic activities of Pomio Kivung members are not intrinsically very exciting . . . Temple rituals are performed somewhat mechanically, like other uninspiring chores, and seem to be neither intellectually challenging nor emotionally arousing" (1995, 86 87). Apparently, during the daily routine of rituals glassy-eyed Kivung devotees not infrequently yawned and even nodded off.

As Whitehouse (1992) emphasizes, the Pomio Kivung ritual system stands in stark contrast to that of the Baktaman, a small group who reside in the central highlands of New Guinea and who were made famous by Fredrik Barth's (1975) classic ethnography, *Ritual and Knowledge Among the Baktaman of New Guinea*. The rituals associated

with Baktaman initiations occur so infrequently approximately once per decade that their retention and transmission must depend upon very different factors. In contrast to the monotony and tedium of Kivung rituals, Baktaman initiations regularly involve considerable stimulation of the initiates' emotions. Whitehouse's proposal is that because these rituals occur so infrequently and because male participants serve only once in their lives as the initiates in these initiations, the initiations bombard initiates' senses in order to arouse their emotions. They are routinely deprived of food, water, and sleep. They are repeatedly beaten and tortured. They are forced to eat what are, in their own estimation, all sorts of disgusting concoctions. They are forced to dance to the point of utter exhaustion. Participants in these rituals are anything but bored! (see Barth, 1975, 64 65).

Stimulating ritual participants' senses is the most straightforward, surefire means available for arousing their emotions. The intuition is that the resulting levels of emotional excitement are often at least roughly proportional to the levels of sensory stimulation a ritual contains. These emotional responses are virtually always involuntary, and with particularly intense sensory stimulation, they are often difficult to control.

Some religious rituals are renowned for their sensory pageantry. Rituals employ countless means of arousing participants' emotions. No sensory modality has been neglected. Religious rituals are replete with the smells of burning incense and the tastes of special foods, the sounds of chanting and the sights of ornate attire, the kinesthetic sensations of the dancer and the haptic sensations of the fully immersed. The Baktaman are experts on these fronts.

Whitehouse and I share two assumptions here: (1) that participants find rituals that are loaded with sensory pageantry emotionally provocative; and (2) that this emotional provocation tends to make at least some features of these rituals more memorable than they would be otherwise. We agree, in short, about the effects of sensory pageantry and about at least one of the reasons why rituals incorporate it when they do. Our disagreements mostly concern the "when they do" part of the previous sentence. The empirical question I want to explore is "*which* religious rituals incorporate such high levels of sensory pageantry?" or, given our common assumptions about its effects, "which religious rituals turn up the emotional volume?"

Whitehouse's short answer (e.g., 1992, 785) is that *when* rituals turn up the emotional volume is overwhelmingly a function of the frequency with which particular rituals are performed. Still, Whitehouse embeds that short answer in a far more comprehensive theory of what he calls "modes of religiosity" (1995, 194). There are two such modes, which he calls the "doctrinal" and "imagistic," each of which has its characteristic style of codification. Whitehouse's proposal has at least three notable features. First, the theory is general; it is applicable to religious systems of any shape or size. Second, the theory's scope is enormous. Whitehouse argues for correlations among the values of thirteen different variables pertaining to religious systems. These thirteen variables deal with social, political, structural, historical, ideological, demographic, and cognitive issues. The third and, for my purposes, most significant feature is that Whitehouse's theory (1995, 194) contains a cognitively oriented, causal hypothesis. Whitehouse (1995, 220) insists correctly I believe that any theory about social and cultural forces that does not refer to the "micro-mechanisms of cognition and communication" will be importantly incomplete (1996a, 64).

Whitehouse (1995, 197) labels the three pivotal variables among the thirteen in his theory "style of codification," "frequency of transmission," and "cognitive processing." He argues that differential frequencies in opportunities to transmit cultural materials occasion different cognitive processes, which demand different styles of codification of religious materials. Those styles of codification, in turn, shape the values of the other ten variables (Whitehouse 1992, 784 and 1995, 194). So, for example, the character of religious experience does not result from the contents of religious beliefs so much as both result from styles for codifying religious materials, which themselves hinge on the details of the underlying cognitive processing. These details of underlying cognitive processing are, in turn, functions of the demands on human memory. Thus, the impact of cognitive processes on these constellations of social and cultural variables is largely indirect (Whitehouse 1992, 791). Those demands on memory are a direct result of the frequencies with which these rituals are performed. Performance frequency, then, is the unexplained independent variable at the heart of Whitehouse's theory (Whitehouse 1996a, 175).

Enlisting Endel Tulving's (1983) distinction between semantic and episodic memory, Whitehouse notes that these two types of cognitive

representation arise, respectively, in connection with frequent and infrequent occasions for the transmission of cultural materials. Semantic memory concerns our general knowledge of the world. Such knowledge is not typically tied in our memories to recollections of specific episodes. We just know that gas pumps deliver gasoline; most of us do not remember the first time we encountered that fact. In contrast, episodic memories *are* a person's memories for specific events in his or her own life. Our episodic memories provide the building blocks for our life stories.

Whitehouse claims that the divergent principles of codification characteristic of the mainstream Kivung ritual system, on the one hand, and those of the Baktaman, on the other, simply represent adaptations to differential demands on memory. He argues that "messages are cultivated, structured and transmitted by two contrasting techniques . . . these techniques constitute particular adaptations to differences in the frequency of reproduction and hence in the demands made on memory" (1992, 789). These two contrasting techniques connect, respectively, with Whitehouse's two modes of religiosity.

Infrequent transmission dictates an imagistic mode of religiosity, the style of codification of which relies on iconic *imagery*. Whitehouse associates this imagistic mode with indulgent, small-scale, socially cohesive groups that tend to have loosely formulated, flexible ideologies. The imagistic mode arises when infrequent transmission requires that participants rely on episodic memories. That means that the retention of cultural knowledge in such settings depends upon participants' abilities to recollect particular, specific events from their pasts (such as their initiations). Merlin Donald (1991) argues that both the episodic memory system and rituals that rely on it have earlier origins than the system of semantic memory and the rituals that rely on it. The imagistic mode relies on "emotional and sensual stimulation and cognitive shocks" to engender improved episodic memory (Whitehouse 1995, 198). Whitehouse stresses that "intense emotional states are a crucial element of the nexus" of factors characteristic of the imagistic mode (1996b, 713).

In contrast to the imagistic mode, the style of codification exhibited by the doctrinal mode is fundamentally *linguistic*. The so-called "religions of the book" operate chiefly in the doctrinal mode. Common sense, let alone experimental cognitive psychology, counsels, however, that without reading, writing, and available texts, the

main way people can gain command of a substantial body of linguistically formulated materials is by means of frequent exposure or rehearsal. Memory in the doctrinal mode depends upon participants building up general schemas in semantic memory on the basis of frequent encounters with religious materials. Transmission does not depend upon participants' recollections of unique events.

Whitehouse associates the doctrinal mode with proselytizing religions that are not confined to a single locale. Consequently, their orientation is "universalistic" and their communities are mostly "imagined" with less social cohesion than religious communities that operate in the imagistic mode (Whitehouse 1995, 197). With the doctrinal mode, the tie that binds is not the experiences in common of similar, emotionally provocative rituals; instead, it is disciplined mastery of a unified, logically integrated, inflexible collection of often elaborate, explicitly formulated beliefs that a focused leadership has compiled in a mostly "emotionless way" (Whitehouse 1995, 197).

To properly introduce these bodies of doctrine, let alone insure their mastery, requires frequent presentations. This is especially so if a culture lacks the tools of literacy. "In an oral tradition, persuasion by the logic and coherence of cosmology and ritual at the same time necessitates frequent repetition . . . their persuasive capacities are in no small degree a function of the extent to which they can be preserved as an entirety through frequent transmission" (Whitehouse 1992, 787 88). Without literacy, the command of an extensive system of beliefs and practices is impossible without their continual re-presentation; nevertheless, Whitehouse insists that literacy does not alter substantially the patterns characteristic of the doctrinal mode. Religions in the doctrinal mode focus on frequent repetition of highly routinized rituals with little emotional excitement, whether they occur in literate cultures or not.

The ritual frequency hypothesis proposes that the amount of sensory pageantry and, therefore, the amount of emotional stimulation any religious ritual involves are inversely proportional to the frequency with which that ritual is performed. Performing rituals frequently yields low levels of sensory pageantry and little emotional kick, while the infrequent performance of a ritual necessitates higher levels of sensory pageantry resulting in a bigger emotional bang. Whitehouse's ritual frequency hypothesis springs from the thoroughly reasonable assumption that the evolution of religious ritual

systems is likely to reflect sensitivity to the role that mnemonic variables play in the transmission of those systems. I do not disagree. We differ, however, about *when* participants conjure elevated levels of emotion in some religious rituals.

THE RITUAL FORM HYPOTHESIS

The ritual frequency hypothesis maintains that the infrequent performance of some rituals necessitates high emotion in order to produce flashbulb-like, episodic memories. In contrast, I shall defend the *ritual form hypothesis*, which holds that instead of ritual frequency, it is *ritual form* or, more precisely, participants' tacit knowledge about differences in ritual form, that determines *when* a religious ritual includes increased levels of sensory stimulation and emotional excitement.

As an account of the interplay of ritual, emotion, memory, and more, the ritual form hypothesis is the result of a natural abductive inference from the larger cognitive theory of religious ritual competence that Tom Lawson and I advanced in *Rethinking Religion* (1990). That theory supplies the means for characterizing the forms of rituals precisely, and it includes principles that distinguish among these forms. There, we showed that the Principles of Superhuman Agency and Superhuman Immediacy generate a typology of ritual forms, which organize, and thereby partially explain, a number of features about religious rituals.

Here I shall show how those principles account for when religious rituals enlist emotional stimulation and when they do not, and how that typology of religious ritual forms segregates these two sorts of cases. Our theory of religious ritual competence is rooted in the claim that participants' cognitive representations of their religious ritual acts result from the same system for the representation of action that we utilize in representing ordinary actions. The representations of rituals arise from a perfectly ordinary cognitive system expressly devoted to the representation of action, *not* merely the representation of ritual. Empirical research in developmental psychology shows that young children gain command of the categories "agent" and "action" and deploy them to make sense of their experience and guide their behavior (Gelman *et al.* 1994). Other developmental research reveals that by school age, children have mastered a theory of mind for managing in the social world;

thereafter, throughout the course of cognitive development, this theory of mind seems to undergo little change (Leslie, 1994).

Possessing that theory of mind provides the child with all of the representational resources necessary for the operation of the action representation system that our theory of religious ritual competence proposes. That system generates abstract representations (or what we called "structural descriptions") of actions, which we portrayed by means of tree diagrams. The structural descriptions of religious rituals differ from those for ordinary actions on only one front. A religious system's conceptual scheme provides *special entries* for at least some of the slots in a ritual's full structural description.

A ritual's *full* structural description is not merely a description of the surface features of the current ritual under scrutiny. Instead, it includes further structural descriptions of all of the enabling ritual actions the current ritual presumes. Enabling actions are simply (earlier) rituals, the successful completion of which is necessary for the successful completion of the current ritual. So, for example, a wedding is not valid, typically, if the priest performing it has not been properly certified ritually. The priest's ordination *enables* him to perform weddings successfully. That ordination is, therefore, an enabling ritual, the structural description of which must be incorporated into the wedding's *full* structural description.

The special entries religious conceptual schemes contribute to action descriptions include such things as culturally postulated superhuman agents (henceforth CPS-agents), religious ritual practitioners, sanctified objects, and special ritual acts (such as baptisms, blessings, sacrifices, initiations, investitures, consecrations, and so on). Lawson and I hold that the diversity of religious ritual agents and actions notwithstanding, knowledge about only two dimensions of CPS-agents' involvement in religious rituals' action structures is all that is necessary for explaining a wide array of those rituals' features. These two dimensions of ritual form (either individually or jointly) determine many properties, including:

(1) whether or not the ritual's effects are potentially reversible by means of other rituals;
(2) whether or not the ritual may permit substitutions for various ritual elements;
(3) whether or not participants need to repeat the ritual;
(4) how central (comparatively) the ritual is to the overall religious system (Lawson and McCauley 1990); and, as I shall argue here,

(5) when (and why) religious rituals enlist sensory pageantry and emotional excitement.

The first of these two dimensions concern whether a CPS-agent serves as a ritual element in the current ritual or, if not, with which of the current ritual's elements a CPS-agent is ritually connected. However, since more than one element in the current ritual may have ritually mediated connections with some CPS-agent or other, the second of these two dimensions concerns the number of (presumed) enabling rituals necessary to establish each of these various connections, i.e., the number of enabling rituals each of these connections requires to implicate a CPS-agent in the ritual's description. This second dimension, in short, concerns which element of the current ritual has the most *direct* ritual connection with a CPS-agent. At least from a formal standpoint, the buck might be said to stop with the *nearest* god, where the proximity in question concerns the number of intervening rituals.

The Principle of Superhuman Agency (henceforth PSA) and the Principle of Superhuman Immediacy provide standards for assessing variation along these two dimensions. These two principles, in effect, delineate criteria for systematically classifying religious rituals in terms of formal properties of their structural descriptions. They classify a ritual according to the *location* of the first CPS-agent implicated in its structural description. On the basis of that information, the two principles assign each ritual a type and a depth, respectively.

The PSA holds that whether that *initial appearance* of a CPS-agent in a ritual's structural description is either as the agent in the current ritual or as some element in a ritual connected with the agent in the current ritual is what determines that ritual's *type*. An important contrast exists here between two phenomena. On one hand, a CPS-agent may serve as the agent in the current ritual, or it may have its most direct ritual connections with the agent of the current ritual. On the other hand, a CPS-agent may serve as one of the current ritual's other ritual elements (such as its patient, or what, in *Rethinking Religion* we referred to less efficiently as the ritual's "logical object"), or it may have its most direct ritual connections with one of those other elements. Examples of the first type include baptisms, weddings, and funerals. Examples of the second type include sacrifices, blessings, and purifications.

The Principle of Superhuman Immediacy (henceforth PSI) defines

what counts as the "initial appearance" of a CPS-agent in a ritual's structural description. The connection that involves the fewest number of iterated embeddings of enabling rituals between an element in the current ritual and an underlying CPS-agent specifies the initial appearance of a CPS-agent in that ritual's structural description and provides the measure of that ritual's *depth*. Here the crucial contrast concerns the various numbers of enabling rituals involved in connecting different elements at the surface of the current ritual (if they have such connections) with CPS-agents. The most direct of these connections, i.e., the one involving the smallest number of consecutively linked enabling rituals, picks out the initial appearance of a CPS-agent in the structural description and that determines that ritual's depth. Less formally, a ritual's depth is a function of the fewest number of rituals that must be presupposed in order to connect one of the current ritual's elements with a CPS-agent. Thus, the greater a ritual's depth, the more distant are its connections with the gods (and the less central the ritual is to the religious system).

Combining these two dimensions generates the typology of religious rituals' structural descriptions in figure 5.1. (This figure summarizes the organization of the resulting system of classification, which employs the same numbering of types as figure 17 in *Rethinking Religion*, pp. 128–130.)

The PSA maintains: (1) that the *role* of the element in the current ritual that has the most direct (ritual) connection with a CPS-agent is the significant consideration in determining that ritual's form; and (2) that we should distinguish types of ritual forms, first and foremost, according to whether that initial reference to a CPS-agent in a structural description comes via a connection with the agent in the current ritual or with some other ritual element. Thus, the PSA distinguishes two basic kinds of ritual types, designated by odd and even numbers, at each level of structural depth. In odd-numbered types, the initial entry for the CPS-agent falls under the initial participant node, i.e., the node indicating the agent who is acting in the current ritual. Less formally, the most immediate connection with a CPS-agent in the current ritual is by way of its *agent's* ritual history. The gods' most direct connection with the current ritual is through its ritual agent, e.g., a priest. In contrast, in even-numbered types, the entry for the initial CPS-agent falls under the nodes for

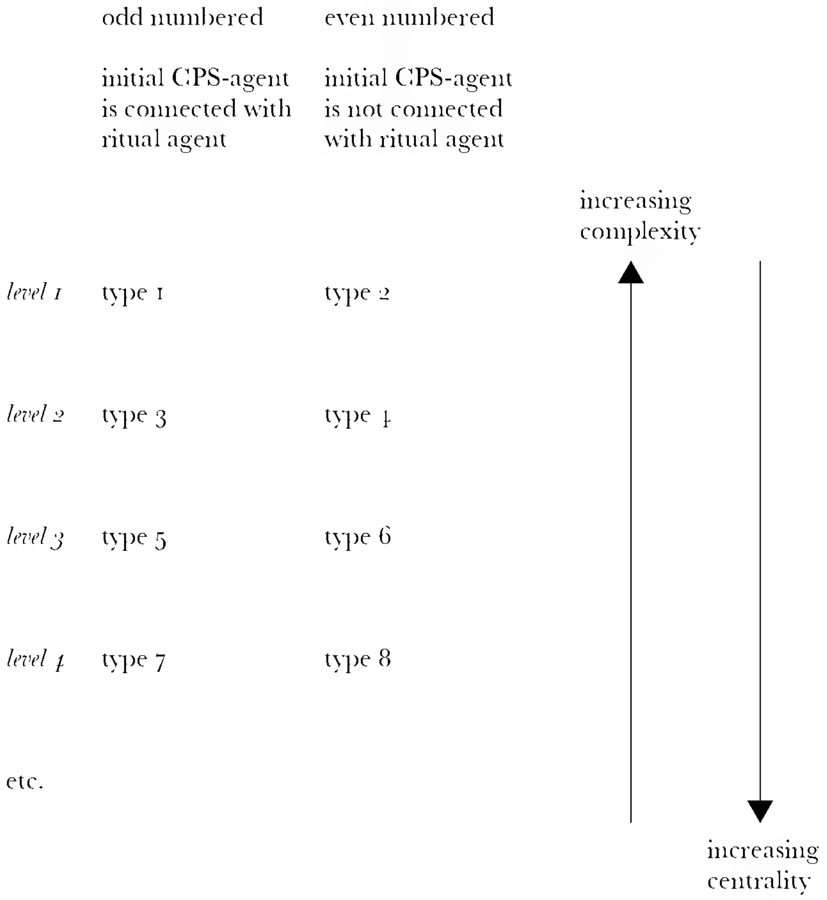

Figure 1 Properties of religious ritual types

either the current ritual's act or patient. The gods' most direct connections with rituals of even-numbered types are through the instruments or patients in the rituals.

This distinction between odd- and even-numbered types of rituals is critical to clarifying how the ritual form hypothesis makes sense of the place of sensory pageantry and emotional arousal in religious rituals. This formal vocabulary readily provides a means for stating the ritual form hypothesis: the *comparative* levels of sensory pageantry

within *particular religious communities* will always be higher in rituals whose forms exemplify odd-numbered types than in rituals whose forms exemplify even-numbered types regardless of the rituals' depths. It will take a good deal of space to unpack this claim.

Beginning with the first of the italicized qualifications, the ritual form hypothesis accounts for *comparative* levels of sensory pageantry between rituals. Quantitative measures of sensory stimulation in something as fluid as a ritual are not easy to obtain and, once had, are extremely difficult to compare across modalities anyway. The resulting emotional arousal is also a many-splendored thing. An ecstatic response to good fortune is every bit as much a form of emotional arousal as is the profound sadness that typically accompanies the loss of a loved one. Even when they are possible, direct measures of emotional arousal (e.g., self-assessment) are not precise, and precise measures (e.g., heart rate) are not direct. But, accurate comparative judgments often do not require precise constituent judgments, and in the case of religious ritual, the differences are usually so substantial that the comparisons are uncontroversial.

This leads to the second qualification. The ritual form hypothesis makes sense of comparisons of rituals' levels of sensory pageantry within *particular religious communities* only. The hypothesis does not predict differences either between different religious systems or even between different religious communities within the same religious system. In light of the fact that Whitehouse does not qualify his version of the ritual frequency hypothesis in this fashion, it would seem that its predictions about comparative levels of sensory pageantry should hold across both religious communities and religious systems. His focus on mnemonic considerations as the primary underlying variable shaping many features of cultural (i.e., religious) detail is consistent with this conclusion. I suspect that this consequence of the frequency hypothesis is devastating, as it appears that contrary evidence abounds. It is easy enough to reformulate the frequency hypothesis with such a qualification in place, however. Cultures and social classes can vary widely concerning the levels of sensory pageantry and emotional display that constitute their base lines. (Contrast, for example, Baktaman and upper-middle class American Protestants' sensibilities.) On this point, local differences matter.

With these qualifications in place, I will turn to explicating the ritual form hypothesis. The hypothesis concerns ritual *form*, because

it is participants' tacit knowledge of, and resulting sensitivities to, the differences in ritual form between broad groups of religious rituals that are the crucial variables that account for the connections between religious ritual, sensory pageantry, and emotional arousal. So far, I have provided relatively formal accounts of these differences. It now will help to describe these two groups of rituals less formally.

The frequency hypothesis holds that frequently performed rituals require less sensory pageantry. This is the typical profile of rituals the forms of which exemplify even-numbered types (henceforth "even-numbered rituals"). What are these rituals like? The first point to emphasize is that these *are* the rituals that are usually performed frequently, just as Whitehouse notes. However, to say this is merely to highlight the fact that the variables I am championing correlate well with frequency. But *why* are they performed frequently? Performance frequency is the (unexplained) independent variable of this kind of account, so this question remains unanswered. In contrast, the ritual form hypothesis provides an answer.

The forms of these rituals necessitate that participants can do them repeatedly. Even-numbered rituals are those in which the most immediate connection between some element of the current ritual and a CPS-agent is by way of the instruments employed in the ritual act or by way of the ritual's patient. Often the patient in an even-numbered ritual *is* a CPS-agent. Most offerings, including sacrificial ones, illustrate this arrangement. Consider, for example, the role of the ancestors in the Kivung temple rituals.

To put it the other way around, the agents in even-numbered rituals are more distant (ritually) from the religious system's CPS-agents than are either the implements they use (e.g., holy water) or the patients they are acting upon (e.g., the body and blood of Christ). Whatever connections they have with the gods occur at a point of greater structural depth than do the connections of one or more of the other ritual elements. (For an illustration of an even-numbered ritual in which the initial connection with the CPS-agent comes by way of the ritual *instruments*, see the extended discussion of the basic Catholic blessing in Lawson and McCauley 1990, 95 121.) Any connections the agent has to CPS-agents are less close than the connections with CPS-agents that other elements in the ritual enjoy.

Under these circumstances, the agents whether they are priests or ordinary participants *repeat* these rituals, since from the stand-

point of ritual form, whatever connections they have with the gods are, quite literally, of secondary importance at best in these sorts of ritual contexts. The secondary status of their connections with CPS-agents in these rituals means that the ritual agents in even-numbered rituals are not acting in the gods' stead, as they do in most odd-numbered rituals. Consequently, these ritual agents are incapable of bringing about what Lawson and I (1990, 134, note 8) called "super-permanent" religious effects. Super-permanent effects are putative arrangements that can (and often do) exceed even the spatial and temporal limits of participants' lifetimes. Religious systems marry husbands and wives at least for life, but in some they marry them for afterlife as well. "Born-again" believers are born again to a new life that extends beyond their death here on earth. In contrast, the effects of even-numbered rituals are always temporary only. Getting a second blessing can help, however; getting initiated a second time is simply redundant. Since the effects of even-numbered rituals are always temporary, reversing rituals do not exist for them. Developing rituals to reverse the effects of earlier rituals is unnecessary when the earlier rituals' effects are temporary only.

Since CPS-agents are neither the agents themselves nor connected with even-numbered rituals' agents primarily, it is not just the effects of those rituals that are tentative. That every participant performs these rituals repeatedly indicates that nothing religiously indispensable turns on any one of their performances. Ritual substitutions abound in even-numbered rites the sand for the water, the cucumber for the bull. Some even-numbered rituals (e.g., the Eucharist) even substitute for CPS-agents. In contrast, such substitutions for CPS-agents do not arise in the rituals of odd-numbered types. In these rituals, the CPS-agents either serve as the agents of the rituals themselves, or the agents in those rituals accomplish what they do by virtue of the preeminence in the ritual's structural description of their ritually mediated relationship with a CPS-agent.

Even-numbered rituals are *repeated*. Odd-numbered rituals are *non repeated* rituals. In one sense, all rituals in which human beings participate are rituals that are done repeatedly. However, because within a religious community all rituals are repeated given enough time, it does not follow that particular *individual* participants do them repeatedly. In using the terms "repeated" and "non-repeated," I am making distributed predications about the ritual activities of individual participants. Odd-numbered, non-repeated rituals are rituals,

such as initiations or ordinations, in which participants fill one of the roles in the ritual (virtually always the role of the ritual's patient) only once in the course of their lives. In contrast, even-numbered, repeated rituals are rituals, such as the Pūja or the Eucharist, in which none of the roles are ones that have constraints of this sort. The same people participate in these rituals time and time again. Though specific individuals may be limited as to which roles they can take in these rituals, no role is one that eligible participants characteristically take only once in their lifetimes. The *same* individuals do repeated rituals repeatedly, whereas at least the patients change with each performance of the odd-numbered, non-repeated rituals.

What is it about the forms of non-repeated rituals such that they are always classified as one of the odd-numbered types? Odd-numbered rituals are those in which, among all of their ritual elements, it is their agent who has the most direct ritual connection with a CPS-agent. Characteristically, these are rituals that ritually certified religious practitioners perform; these rituals take the forms that they do precisely because of those practitioners' ritual certifications. Priests can perform baptisms, blessings, weddings, funerals, and more, *because* they are priests. Through earlier rituals, e.g., their ordinations, they have gained a more direct ritual connection with a CPS-agent than many of the people and things that they will act upon ritually. So, when they act ritually in those cases, they act in place of the CPS-agent with whom their ritual certification connects them. In effect, the agents in odd-numbered rituals act as intermediaries on behalf of the CPS-agent with whom they are ritually connected. The agents in odd-numbered rituals *must* have ritual connections with the gods.

Why, then, do such relationships also not predominate in even-numbered rites? After all, priests perform sacrifices or the Eucharist just as they perform initiations or baptisms. Nothing about even-numbered rituals abrogates these previously established ritual relationships. The difference with even-numbered rituals is that some other element in the current ritual, the instruments or the patient, either has a more intimate relationship with a CPS-agent or, even more straightforwardly, *is* a CPS-agent. The classic rites of passage are good examples of odd-numbered rituals (van Gennep 1960). Typically, the rituals that mark entry into this world at birth, into the adult world during adolescence, and into another world at death are rituals participants only go through once.

When the gods act, either directly or through their certified intermediaries, the rituals result in super-permanent effects. Of course, the psychological causation could be in just the opposite direction. Some religious arrangements are regarded as super-permanent. Transparently, these are not arrangements that mere humans can establish on their own. Consequently, CPS-agents are inevitably implicated in the actions that bring about these states of affairs. In either case, the powers of the gods are such, and their abilities to project those powers through their ritually certified intermediaries are such, that these rituals need only be done *once* with each patient to establish such effects. When the gods do something   either directly or indirectly   it is done once and for all. There is no need to repeat these rituals. This is why participants undergo these rites only one time. This is also the key to why the rituals filled with sensory pageantry are always rituals of this sort.

If a ritual establishes a super-permanent arrangement, it must convince participants that something profound is occurring. Since humans alone cannot inaugurate super-permanent arrangements, the gods must have a hand in them. So, in addition, participants need to know that it is the gods who are ultimately responsible for those profound goings-on. These odd-numbered rituals often include direct indications that it is CPS-agents who are responsible for what is transpiring. For example, it is no coincidence that so many initiations include opportunities for candidates to confront particular CPS-agents directly, whether as masked dancers (Whitehouse 1995), or as skulls (Gardner 1983), or as skulls the eye sockets of which are illuminated (Fernandez 1982), or as images of CPS-agents in cave paintings (Mithen 1996), etc. These sorts of stimuli include just the sorts of cues that contribute to agent detection by humans (see Baron-Cohen 1997).

Extreme emotions signal to human beings that the current objects of their attention are particularly significant personally. That contention has implications for more than just memory. The high emotion of some religious rituals establishes convictions about the significance of both those events and the CPS-agents who are putatively responsible for them   especially when they appear to be directly involved. Religious rituals' manipulations of sensory pageantry and participants' emotions are not academic exercises about proving the existence of the gods. When the most salient, available hypothesis suggests it, the extreme emotion such rituals instigate helps to

persuade at least some of the participants involved not only that they have undergone fundamental changes, not only that it is the actions of CPS-agents that are responsible, but also that those same CPS-agents are vitally important to them and, often, to their community as well.

To summarize, then, the ritual form hypothesis differs from the frequency hypothesis both concerning *which* religious rituals contain elevated levels of sensory pageantry and, at least in part, concerning *why*. The ritual form hypothesis maintains that heightened sensory pageantry arises only in rituals of odd-numbered types, which characteristically spawn super-permanent effects. Ultimately, only the gods can bring about such effects, thus, in these rituals, the gods either act directly or certify the action indirectly. Consequently, each individual needs to undergo these rituals only once. Participants need to remember these special ritual episodes, but rituals of this sort also must persuade participants both of the importance of these events and of the gods' involvement. Stirring their emotions so much helps contribute to this end, too. The resulting convictions play a critical role in increasing the probabilities that participants will transmit these ideas subsequently.

COMPARING THE TWO HYPOTHESES

Space limitations do not permit a comprehensive evaluation of these two hypotheses. In this section I will briefly review two considerations that will, at least, help in assessing their comparative merits. The first concerns purely theoretical matters. The second is a brief glimpse at some relevant empirical evidence. On both counts, I shall argue that the ritual form hypothesis proves the better of the two alternatives.

An important ambiguity plagues the ritual frequency hypothesis. A fair assessment of that hypothesis' predictions depends upon agreement about performance frequencies. Ascertaining performance frequencies, however, is no simple matter. When considering the frequency hypothesis, what is the relevant sense of "performance frequency?" Should opportunities to observe a ritual (but not participate directly) count in tallies of performance frequencies? Distinguishing between participation and observation is only the beginning, for with religious rituals, both participation and observation may take many different forms. Typically, practitioners,

patients, and observers have rather different experiences. If all of these roles (i.e., practitioner, patient, and observer) count, then merely tallying the numbers of performances for each ritual may suffice. But not always. In some religious systems, raw performance frequencies can be misleading, since rituals are sometimes cloaked in secrecy. Some Mormon and Shinto rituals, for example, are not available for observation. I shall set these additional problems aside, though. Finally, the issue I am raising here need not turn on anything more complex than underscoring the basic point that participating in a religious ritual and observing others participate in a religious ritual are not the same things.

Nearly everything about Barth's reports about the Baktaman suggests that getting initiated is a very different experience from supervising an initiation, let alone merely observing one, let alone pretending not to observe one (as so often is the case with women with respect to male initiations). Such odd-numbered, non-repeated rituals are of primary interest here, since for each of these rituals, individuals almost always take the patient's role *only once* in their lives. Note, this is true whether those rituals can occur: (1) as often as every day, as Christian baptisms and ordinations may, albeit with different patients each time; or (2) only once per decade, as with Baktaman initiations. These two extremes nicely illustrate the problem. If comparatively direct participation is the relevant measure of frequency, then in both of these situations, the relevant frequencies of these rituals are very low for everyone involved (except for the clergy who preside at the Christian rituals in question). In these rituals, people serve as patients only once, and even most of the Baktaman "practitioners" *perform* each degree of initiation only once thereafter, i.e., in the initiation of the next age cohort roughly ten years later.

If, on the other hand, opportunities to *observe* these rituals also count, then the next problem for the ritual frequency hypothesis is that the performance frequency of the Christian rituals changes dramatically. The Christian baptisms and ordinations no longer count as once-in-a-lifetime events, but rather they are seen as rituals of at least comparatively moderate frequency, whereas Baktaman initiations remain extremely rare. On this more liberal measure of performance frequency, the ritual frequency hypothesis also faces an empirical problem not faced by the ritual form hypothesis, since *within* their respective religious systems, both these Christian rituals

and the Baktaman initiations are *comparatively* heavy hitters from the standpoint of sensory pageantry and emotional stimulation. (This is *not* to suggest that many forms of Christian baptism or ordination are particularly stimulating emotionally – compared with the rituals of many other religious systems!) The ritual frequency hypothesis would make the false prediction that the Christian rituals in question should not be, though, since they occur with moderate frequency at least. By contrast, the ritual form hypothesis would make the correct prediction that, by virtue of their odd-numbered forms, these rituals should include relatively high levels of sensory pageantry compared with the levels characteristic of the even-numbered rituals in the pertinent Christian community.

This suggests that advocates of the ritual frequency hypothesis should avoid this more liberal measure of performance frequency. The ritual frequency hypothesis faces fewer problems, if the assessment of performance frequencies does not include opportunities for the observation of rituals. Although Whitehouse does not address the distinction between participation and observation directly, various comments (e.g., 1995, 215–216), indicate that he recognizes the distinction and opts for the more conservative measure. But, adopting this conservative measure of performance frequency, which focuses on participation in rituals only, as opposed to observations as well, presents a new problem for the ritual frequency hypothesis.

If the measure of performance frequency looks to direct participation in rituals only, then the question "why are some rituals performed more frequently than others?" substantially *reduces* to the question "why are some religious rituals repeated while others are not?" (*In most cases* in most religious systems, where proportionately small numbers of participants ever serve as ritual practitioners, *the first question reduces to the second completely*.) The crucial point is that the question of ritual repetition is one that the ritual form hypothesis can answer. When religious rituals have high levels of sensory pageantry, they are odd-numbered rituals in which most people directly participate only once. For each patient, these rituals need only be done once, because the CPS-agents in these rituals either act directly themselves or certify their intermediaries' actions indirectly. These rituals contain high levels of sensory pageantry and emotional arousal, because participants must *remember* these unique ritual experiences, and they also must emerge from them with the *conviction*

not only that something profound has transpired, but also that the actions of the gods are ultimately, if not proximally, responsible for that profundity.

Aspects of ritual form which my and Lawson's theory pinpoints determine whether religious rituals are repeated or not, which is the principal variable determining the frequencies with which people directly participate in (as opposed to merely observe) religious rituals. Thus, for the overwhelming majority of religious rituals, rituals' performance frequencies and the cognitive variables determining ritual types have a high positive correlation (see Whitehouse 1996b, 712). Consequently, most of the time, the two hypotheses' predictions are the same. But not always. This leads to the second consideration concerning some empirical evidence that is relevant to the assessment of the two hypotheses.

All of the high frequency rituals from the Pomio Kivung that Whitehouse discusses are even-numbered rituals that are repeatable. Although people participate in most even-numbered religious rituals frequently, *a ritual's repeatability does not require its frequent performance.* The repeatability of an even-numbered ritual does not entail that participants, in fact, repeat the ritual frequently. It only requires that even-numbered rituals be *repeatable* (full stop). The ritual form hypothesis allows for the possibility that a ritual could be an even-numbered, repeatable ritual yet be performed quite infrequently. (This is not a possibility Whitehouse considers.)

The important point with respect to this possibility is that the two hypotheses make diverging predictions. The ritual frequency hypothesis holds that since such a ritual is performed infrequently, it will rely on (comparatively) high levels of sensory pageantry to consolidate participants' memories. The ritual form hypothesis maintains that since the ritual is even-numbered, it will not include, relatively speaking, high levels of sensory pageantry. Moreover, since it is performed infrequently and does not involve many emotionally stimulating elements, it follows on the ritual form hypothesis that some alternative system of mnemonic support must sustain memory for such a ritual. In a nonliterate society without ritual manuals, such an external system of mnemonic support would be difficult to miss. In fact, at least one such ritual exists.

In the southwestern Indian state of Kerala, the Nambudiri periodically have performed the *Vedic Agnicayana* ritual for hundreds of years. The *Agnicayana* is a *Śrauta* ritual (rather than one of the

Gṛhya rituals associated with the rites of passage). *Śrauta* rituals are a group of offerings dedicated primarily to Agni and Soma. In these rituals, these CPS-agents are the recipients of offerings of various foodstuffs. They are, therefore, the patients of these rituals. The first significant point, then, is that these *Śrauta* rituals, including the *Agnicayana*, are all *even numbered rites*.

The *Śrauta* rituals are ordered hierarchically, and the *Agnicayana* sits at the pinnacle of this group. It is the most complex, and it is performed the least often (Staal 1990, 69). The *Agnicayana* is an extremely complicated ritual that focuses on the painstaking process of building a large, bird-shaped altar according to precise specifications and then carrying out various sacrifices and offerings to Agni. Along the way the ritual includes various ancestral and expiation rites to compensate for possible errors and omissions (Staal 1990, 76). Altogether the ritual takes twelve days to perform. Thus, the second important point is that this ritual confronts participants with a *formidable mnemonic problem* for these cultural materials.

The best available evidence indicates that various Nambudiri families (all of whom resided in only eight villages in the state of Kerala) performed the *Agnicayana* a total of sixteen times between 1844 and 1975, with intervals between performances as large, perhaps, as twenty-six years (Somayajipad *et al.* 1983). Its average performance frequency over this period is eight years and two months. That is very nearly as high as that for each of the degrees of male Baktaman initiation, which Barth estimates at approximately once per decade. So, the third point is that according to any reasonable criterion, including the one Whitehouse himself employs, the *Agnicayana* is a ritual that is *performed quite infrequently*.

The *Agnicayana* is an elaborate ritual that requires extensive, coordinated activity among a large number of ritual participants. The ritual has numerous stages that incorporate various offerings, sacrifices, and other smaller rites. *Vedic* tradition specifies necessary conditions for each of these component rites at length and in precise detail (including such minute details as the number and placement of sticks for each of the ritual fires). Like virtually all *Vedic* rituals, the *Agnicayana* includes the chanting of verses from the *Vedas*. Other than a brief ritual bath that the sponsor of the ritual and his wife take on the final day, the *Agnicayana* neither contains sensory stimulation nor incites emotional arousal that are at all out of the ordinary compared with other rituals in this tradition. Many people are very busy during

those twelve days. A great deal is accomplished, including the construction of a large altar. However, the final point is that the *Agnicayana* contains *no extraordinary sensory pageantry* during its twelve-day performance.

Much of the excitement that accompanied scholars' discovery of the Nambudiri ritual tradition turned on the fact that although texts delineating *Vedic* rituals exist, the mostly nonliterate Nambudiri have sustained this ritual tradition with astonishing precision using oral means alone. The ritual form hypothesis holds that infrequently performed, even-numbered rituals will not rely on sensory pageantry (and cannot rely on performance frequency) to produce extraordinary memory for such a rite. It follows that other cultural mechanisms must exist to insure the transmission of such a ritual. The transmission of the *Agnicayana* relies on at least two such mechanisms.

The first is a mechanism familiar from natural language. The hierarchy of *Śrauta* rituals is a *compositional* hierarchy. Rituals at each level in the hierarchy serve as components in the rituals at the next higher level. Since the *Agnicayana* sits at the top of this hierarchy, it has the most richly detailed compositional structure (Staal 1990, 101). Although these compositional relations provide some mnemonic markers to help organize participants' memories for the ritual, they by no means exhaust the contents of the *Agnicayana*. Even more importantly, though, the Nambudiri support schools for the oral training of *brahmin* boys. Students spend thousands of hours mastering, not only the details of rituals such as the *Agnicayana*, but also memorizing the *Vedas* (the *Ṛgveda* in particular). The Nambudiri seem to possess one of the world's few authenticated, lasting oral traditions (Staal 1990, 68). They have a system of external memory support that is, indeed, "difficult to miss."

The *Agnicayana* is, of course, but a single piece of empirical evidence. However, since it exemplifies one of the comparatively few situations in which the two hypotheses' predictions diverge, it is an especially salient piece of evidence. The ritual form hypothesis seems readily able to accommodate it.

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CHAPTER 6

Psychological perspectives on agency

E. Thomas Lawson

In previous work (Lawson and McCauley 1990), we showed that our theory of religious ritual competence makes substantive predictions about an array of features concerning religious rituals. We also argued that the representation of religious *ritual* action depends upon general cognitive mechanisms for the representation of action. We maintained that the representation of action requires the notion of agency, that the notion of agency involves the notion of agents in action, that such actions either may or may not involve patients, that our technical notion of religious ritual action requires the notion of patients, and, finally, that what distinguishes religious ritual actions from actions of all other kinds is that agents who appear in the structural descriptions of religious rituals possess special qualities. Aside from this notion of special qualities, the structural descriptions of religious ritual action typically possess the same features as do representations of ordinary actions.

Focusing upon the representation of action highlights both the continuities and differences between ritual action and actions of other kinds. The representation of an ordinary action, for example, a man washing a baby with water, would include information such as the facts that the man functions as the agent, washing is the action the agent performs, the baby occupies the role of the patient of the action, and water is the instrument. How does this representation differ from that of a religious ritual in which a priest baptizes a baby with water? On nearly all fronts, not very much. This religious ritual employs the same basic representational structure: A does B to C by means of D. What makes this example of a religious ritual action noteworthy is that its structural description involves an agent (in this case a priest) who possesses a special quality (being ordained) in order to be able to perform the ritual action (baptism) upon a patient (the baby) by means of water (which possesses a special

quality by virtue of having been consecrated previously). The parenthetical information will vary from tradition to tradition, but the structure remains the same someone does something to somebody (or something), often by means of something. The differences turn exclusively on the peculiarities of religious conceptual schemes.

Here, I argue that religious representations, while obviously cultural in content, rest on noncultural foundations of the sort outlined by our theory. The first half of this chapter shows that theoretical and experimental work in cognitive, developmental, and evolutionary psychology supports our theory's prediction that: (1) humans have special resources for representing agents and their actions; and (2) the acquisition of many key features of symbolic-cultural systems, like religious ritual systems, requires neither detailed instruction nor even extensive learning about elaborate cultural models. The second half of this chapter argues that additional empirical findings from recent experimental studies in cognitive psychology corroborate our theory's claim that subjects: (1) will have converging intuitions about the well-formedness of religious rituals; (2) will appreciate the central importance of superhuman agency in the representation of religious rituals; and (3) will judge the specialness of culturally postulated superhuman agents (henceforth CPS-agents) as the most important factor in a religious ritual's success or failure, their lack of familiarity with most of the relevant religious system's details notwithstanding.

RESOURCES FOR REPRESENTING AGENTS AND THEIR ACTIONS

Not only is the theory McCauley and I advanced in *Rethinking Religion* (1990) supported by recent theories of cognitive structure and development, but in turn, it also supports such theorizing. Our theory, for example, describes a specialized action representation system (henceforth ARS) that humans possess for representing subsets of entities (i.e., agents) and events (i.e., actions) in the world. It also makes predictions about how such a system is exploited for religious purposes. Our theory, however, says nothing about the age at which such a system is operative. If we were to discover that even very young children have command of these distinctions about agents and their actions, then it would seem uncontroversial that adults also have access to such resources. Additionally, if it turned out that young children did have command of such distinctions, then

this fact would also permit us to deal with issues concerning the extent to which the noncultural foundations of some forms of knowledge need to be taken into account when dealing with issues concerning the role of instruction in the transmission of knowledge.

In *Rethinking Religion*, we already had argued that, by virtue of such cognitive underpinnings, the acquisition of symbolic-cultural systems such as religious systems does not depend upon extensive instruction concerning the details of elaborate cultural models. The knowledge in question is mostly tacit. We illustrated this, in fact, by showing how, in an informal experiment, subjects were able to specify properties of non-existent religious rituals, e.g., a ritual of divorce. The fact that they were able to do so implied that they had command of a tacit system of knowledge that enabled them to make judgments about the kinds of agents required in such a ritual, the qualities of the agents involved, the number of agents required, and the types of acts that would be necessary for a ritual of divorce to be successful. We thought that such tacit systems of knowledge were underdetermined by cultural input and by instruction in particular, but we did not, in our earlier work, make an explicit appeal to empirical studies in psychology and anthropology. I intend to do so now.

If the developmental evidence shows, as I think that it does, that an ARS is present at an early age, then this would explain why symbolic-cultural systems pivotally do not depend upon instruction for their persistence. In fact, the ARS seems to play a fundamental role in the acquisition of specific cultural contents such as religious concepts (see Figure 8 in chapter 5 of *Rethinking Religion* for the relationship between conceptual schemes and the ARS). While we did not develop an explicit theory of cultural transmission in *Rethinking Religion*, I do think that the theory we advanced there is readily subject to fruitful elaboration by psychologists and anthropologists of religion. Certainly, more and more theoretical and empirical work in this area currently is underway.

Cultural transmission is of considerable theoretical interest because it involves questions about why some representations are successfully transmitted while others seem to disappear. I think that the cognitive variables highlighted by our theory impinge in important ways upon the processes that account for the transmission of culture. This is illustrated by the pivotal, systematic connections between issues of memory and the variables our theory isolates

concerning the character and location of CPS-agents in the representations of religious rituals (see chapter 5 of *Rethinking Religion*). I am concerned with how our theory connects with issues of transmission in terms of the types of cognitive and developmental considerations I explore in the first half of this chapter. This is not a simple story; I shall consider some selectionist ideas discussed by Pascal Boyer (1994, 1998), place these in a general evolutionary framework, and examine evidence from cognitive, developmental, and social psychology.

In elaborating and defending a theory concerning the transmission of religious systems, Pascal Boyer (1994, 1998) has, in effect, confirmed most of the central commitments of the theory we developed in *Rethinking Religion*. This does not mean to imply that Boyer's theory goes no further than ours does. To the contrary, he has developed an account of religious transmission that explores a wide range of issues our theory does not address. Nevertheless, Boyer emphasizes the prominence of selectionist considerations in explaining the cognitive foundations of the transmission and persistence of symbolic-cultural systems such as religions. Some religious representations simply are more easily learned, more easily remembered, and more easily communicated than are others. However, the critical point is that, due to the character of our cognitive systems, some representations are better candidates for selection than others are. Boyer suggests that good candidates exemplify a cognitively optimal balance between intuitive properties that are easily remembered (in fact he argues that they should be regarded as default assumptions) and counterintuitive, attention-grabbing properties.

In discussing "a cognitive catalogue of the supernatural," Boyer notes that the concept of an intentional agent is probably the most frequently manipulated category in religious ontologies. He also observes that this category is fundamental to the intuitive background assumptions that make so much about CPS-agents so readily comprehensible, despite their counterintuitive qualities. Of course, it is just these features of agency and action that our theory's claims about the ARS capture.

In examining the noncultural foundations of religious ritual representations, especially since these involve the notion of agency, we need to examine the relationship between the representation of religious ritual actions and also the representation of actions generally. Human beings clearly seem to possess the cognitive resources

needed to represent action. If it is true, as I have already claimed, that these resources include an ARS capable of being employed for religious ritual purposes, then the opportunity arises to examine the conditions of such a system's emergence, together with the ways in which it suits religious purposes. We need, in other words, to account for its presence and to describe its use. This is where the long-term view of evolutionary theory intersects with the short-term account of cognitive structure and development, i.e., where theories of phylogeny intersect theories of ontogeny. The evolutionary story concerning how human brains developed the way they did inevitably will constrain the ontogenetic story of the development of human cognitive abilities.

Evolutionary theory shows how the process of natural selection shapes organic design. From an evolutionary perspective it certainly seems as if creatures with the kind of mental equipment specified by an ARS capable of distinguishing between agents and everything else would possess an adaptive advantage. Possessing the cognitive wherewithal to distinguish between agents and everything else means possessing the representational resources to detect such agents and to attend to the actions they perform.

Survival in a complex world, both natural and social, clearly would be facilitated by the recognition of agents and their actions. For their own good, creatures with this ability must be able to tell the difference between mom and a breadbox. Both possess important resources, but only mom is able to deliver them on demand. Similarly, our prehistoric ancestors had to be able to distinguish leopards from logs rapidly, or they would have served as the leopard's lunch. Human commerce with the world requires complex representation of agents and their actions in order to facilitate negotiations with the many types of entities present in the environment, whether for the purposes of gaining resources or in order to avoid predators.

A number of psychologists and anthropologists have proposed evolutionary accounts for the organization and structure of the human mind. Some of these accounts have attempted to show how such theories of mind are applicable to religious ideas and practices (Pyysiäinen). Barkow *et al.* (1992), Sperber (1990), Boyer (1994), and Mithen (1996) have, for example, argued that the kinds of minds that we have today have resulted more from the process of natural selection than advocates of cultural learning typically have main-

tained. Because evolution takes a long time, there appears to be very little difference between the minds we have today and the minds our ancestors possessed a hundred thousand years ago. Essentially, our minds reflect our ancestors' adaptation to the Pleistocene period.

Although little about us seems to have changed, a paradox exists, since everywhere around us, we are confronted by an astonishing range of cultural variation and diversity. Cultural contents clearly differ across the globe. And as far as the historical record shows, such diversity has, if anything, accelerated through time. Such cultural variation requires explanation. If our minds have changed little since the Pleistocene period, why are their products so diverse?

This obvious diversity has led evolutionary thinkers interested in culture in general and religion in particular to argue about its depth. Is it variable all the way down, or will sophisticated analysis of sufficient complexity disclose a level of cognitive commonality beneath the surface? Religions are of particular interest here because historical and ethnographic studies present us with a bewildering variety of religious ideas and practices through time and across cultures. The diversity of religious representations provides us with a particularly fascinating case for investigation because it seems to present a major problem for those who wish to postulate the psychic unity of humankind. If we all have the same cognitive equipment, and we all must fulfill the same basic needs, why do we end up thinking so differently, especially in the realm of religious ideas?

The strategy cognitive scientists such as Boyer, Sperber, and Mithen have employed in order to tease out the commonalities underlying such diversity in religious representations has been to attempt to specify the principles involved in cultural transmission. The dynamics of cultural transmission would appear to favor either replication or transformation. One way of dealing with such problems is by examining the cognitive dynamics of cultural transmission. And one of the things that we know about such dynamics is that some forms of knowledge are readily acquired, whereas other forms of knowledge come only with great difficulty (McCauley 1998, and this volume). For example, learning how to speak a language is easy for a young child, whereas learning how to employ the calculus is hard work. What is there about the human mind that makes it predisposed to the rapid acquisition of some information and the

slow and tedious acquisition of other forms of knowledge? For the purposes of this chapter, all we need to recognize is that human minds seem to be predisposed to acquire certain forms of knowledge with astonishing speed and to acquire other forms of knowledge with great difficulty. Of particular interest to us at this point is humans' predisposition to recognize and employ the notion of agency, a predisposition that opens the gates to conceptualizing agents with some extraordinary qualities.

Whether the predisposition to recognize agents early and easily is innate, requiring only certain triggers for its activation, or whether it is the consequence of a complex developmental process, is a fascinating question in its own right. Indeed, this question has generated considerable creative work in cognitive science, together with some rather acrimonious debates. Nevertheless, little that we wish to defend hangs upon the particular perspectives adopted by the contending parties (classical versus connectionist) in this scholarly dispute. For example, Elman *et al.* (1996) represent one aspect of this dispute, in which Elman and his collaborators attempt to redefine classical approaches to issues about innateness, modularity, and domain specificity along connectionist lines. Jerry Fodor's *The Modularity of Mind* (1983) is an influential version of the classical account. In earlier work (1990), I and McCauley already have argued that the acquisition of symbolic-cultural systems such as religious systems, like natural languages, requires little if any explicit instruction and, therefore, rests considerably upon noncultural foundations. The transmission of these systems, especially throughout prehistory and in societies without the benefit of literacy, appears to turn largely on their natural cognitive appeal rather than on the mastery of elaborate cultural models that bear so much of the analytical burden in considerable work in cultural anthropology and the history of religions. Many cognitive features of religious materials, e.g., their overwhelming reliance on narratives, render them the kind of cultural representations that human beings readily generate, learn, remember, and transmit. These materials' persistence suggests that the representational principles our theory isolates should prove cognitively salient; their ready and early acquisition suggests that those principles should arise early in cognitive development.

Generally, research on cognitive structure and development shows that human beings' perceptual systems seem especially

attuned to detecting other human beings and distinguishing them from all other physical objects (Guthrie). People have a "theory" of the kinds of things that there are in the world and what to expect about such things. For example, infants who are four months old seem to have specific expectations about the cohesion and continuity of physical objects and the contact between them (Spelke 1991; Spelke, Phillips, and Woodward 1996 [1995]). Psychologists have designed experiments to gauge the reaction of infants to some rather strange phenomena such as one physical object passing through another. When one physical object apparently passes through another, infants exhibit a sense of surprise. Such an event contravenes infants' expectations about what physical objects can and cannot do because it provides evidence that is unexpected in infants' conception, or "theory," of the physical world. When the expectations generated by an infant's intuitive ontology are violated, the infant "can't believe its eyes!" and the length of its gaze indicates its reaction.

While infants do not expect physical objects to pass through one another, and while they seem to express astonishment when they apparently do (by gazing at them for longer periods of time), they also expect physical objects to differ from each other in important respects. They seem to know that not all physical objects are alike, i.e., that different objects possess different properties. For example, Premack (1990) argues that infants distinguish objects that move when acted upon from those that move on their own. In other words, infants seem to possess the notion of self-propelledness and to have command of its properties. When something moves that is not supposed to, it rivets their attention.

That infants have command of such concepts takes us near the threshold of the notion of agency, because we are dealing with a predisposition that permits infants to differentiate between motion as such and agent causation. Agents can cause themselves to move, and, by virtue of that capacity, they can cause other things to move as well. But while self-motion, or self-propelledness, is necessary for possessing a concept of agency, it is hardly sufficient, and a number of cognitive scientists have proceeded to extend Premack's initial analysis. Alan Leslie (1996 [1995]) has developed Premack's notions and has attempted both to clear the conceptual landscape and to devise experiments to demonstrate the abilities of young children.

CLEARING THE CONCEPTUAL LANDSCAPE

Leslie (1996 [1995]) has made an important contribution to theoretical work about agency by approaching the problem in a particularly lucid and systematic way. He clears the ground by making the case for distinguishing the concept of agency from the concepts of causality and animacy, notions that are often and easily conflated. For example, if we say that Tom broke the window by striking it with a hammer, we can mean that Tom is the cause of the window having been broken, or that the hammer is the cause of the window having been broken, or that Tom is the agent involved in the action of breaking the window. It may be tempting to conceive of either Tom or the hammer as an agent. But Leslie argues that, unless we are speaking or thinking metaphorically, we do not naturally come to think of hammers as agents. Humans are not naturally predisposed to think of hammers in terms of the notion of agency, even if hammers can be moved. So, Leslie argues, we need to be able to specify the difference between causality, animacy, and agency.

Why not argue that the notion of agency involves the notion of causation? By saying that Tom breaks the window, do we not identify Tom as at least one of the causes of the broken window? Leslie argues that there is more at stake in the notion of agency than the notion of causality. Causality typically involves such things as objects impinging on other objects, for example, people such as Tom and hammers breaking windows. Under such a description, both Tom and the hammer are physical and both are causes. But Leslie cautions us not to ignore the fact that there are important differences between hammers breaking windows and people breaking windows with hammers. In the case of the hammer breaking the window, all other factors being excluded, we are dealing with the notion of physical causality, which is a purely mechanistic notion. An earthquake can cause a hammer to bounce into the air, hit a window at the end of its trajectory, and, by such physical contact, break the glass in the window. Regarding the hammer as an agent is not necessary for comprehending this situation. All we need here is the notion of causality. What is interesting, of course, is that very young children seem to know the difference between people and other physical objects such as hammers. For them, there is more to Tom than physical causality. We could say that, because Tom is an agent, he requires a more complex representation than does a hammer.

Leslie also cautions theoreticians against confusing agency and animacy. Animacy typically involves conceiving of things as being capable of birth, growth, reproduction, and death. Possessing such a notion permits us to recognize the difference between kinds of physical objects, namely between those things that are alive and those that are not, such as people and hammers. Although many animate things are obviously capable of being characterized as agents and typically are, the fact that they are animate should not be confused with the fact that they are capable of being viewed as agents. Animacy is a necessary but not a sufficient condition for the notion of agency.

AN EMPIRICAL EXAMPLE

Before we summarize Leslie's constructive analysis of the distinguishing features of agency, we wish to show that his views are not simply the result of philosophical reflection but also are based upon experimental research. In a number of experiments (Leslie 1982, 1984, 1986, [1995]; Leslie and Keeble 1987) Leslie has shown that infants employ a complex concept of agency. For example, he argues (1996 [1995]) that six-month-old infants recognize the billiard ball "launching effect," which simply involves an event in which one billiard ball hits another billiard ball. Before we describe Leslie's experiment, we should know what his purpose was in performing it. Leslie designed the experiment to demonstrate that there is a level of representation basic to human intelligence that makes mechanical information explicit. If this claim is correct, according to Leslie, then Hume's attempt to eliminate mechanics from human understanding and replace it with the registration of spatio-temporal properties and the statistical association of spatio-temporal properties with one another is misleading. He agrees with Hume that humans see only spatio-temporal properties because vision involves explicit information about space and spatial arrangements over time. But Leslie thinks that Hume was wrong to argue that our idea of causation is based upon statistical association. "What makes launching seem 'perfect' to us as an instance of cause and effect is that it instantiates a mechanical interaction with a perfect transmission of 'FORCE'" (1996 [1995], 124).

Leslie's experiment with the billiard ball launching effect proceeds as follows. The experimenters habituate a group of infants to a film

of a direct launching event in which billiard ball number one rolls towards billiard number two and makes contact with it. Billiard ball number two moves upon the contact. The experimenters habituate a second group of infants to a variation of the launching event by introducing a time delay of 0.5 seconds between the impact of number one on number two and the movement of number two. According to Leslie, Michotte (1963) already had demonstrated that when adults were presented with these two types of events, the interposition of the short delay destroyed the impression of causality in the first events. In the case of the infants, each group, after having been habituated to their respective events, were then shown the event to which they had become habituated in reverse, i.e., by running the film backwards. Running each film backwards involves a change in both spatial direction and temporal order. In the film without the time delay, the pusher becomes the pushed (pushers are transmitters of FORCE, the pushed are its recipients). Reversing the film maintains this effect. However, there exist neither pusher nor pushed when running the second film with the time delay backwards. Reversing the film does not reverse the roles. Leslie concludes,

> If the infants construe these events from a mechanical point of view, then the direct launching event in reverse (film 1) will be more interesting than the non-causal delayed event in reverse. Therefore, even though the spatio-temporal changes and the contingency properties are equated in the test for the two groups, the causal group should recover attention more. This is exactly what we found. (1996 [1995], 126)

What Leslie has shown is that, because of the role reversal, the subjects in the first experiment, after having been habituated to the billiard ball hitting another ball and causing it to move, will recover their attention when the film is reversed. The pushed becomes the pusher. In the second experiment, because of the time lag, there is no perception of causation. Thus, when the film is reversed, exactly the same thing happens as in the first film. Because there is no reversal of roles, there is nothing new to observe and no reason for the subject's interest to be revived.

LESLIE'S CONSTRUCTIVE VIEWS

If Leslie is right, then we have evidence that six-month-old infants already possess the concept of a physical object that possesses the

property of transmittable FORCE from one physical object to another. This is one aspect of the *mechanical* element in the notion of agency. What we need, in addition, is the notion of an internal, renewable sense of FORCE. Leslie says:

> Because objects move as a result of force, and because Agents have an internal and renewable source of FORCE, Agents are free to move on their own what Premack (1990) calls self-propelledness. Mere physical objects, however, lack an internal and renewable source of FORCE and therefore move only as a result of receiving FORCE externally from Agents or other objects that bear FORCE transiently. This simple FORCE dynamical assumption, relating patterns of motion to the force properties of the objects exhibiting the patterns, provides a powerful learning mechanism for the infants. (1996, 131)

In our cognitive repertoires, agents, though physical and therefore capable of acting as causes, and though animate, and therefore capable of actualizing all the properties of living things, are cognitively represented as a special type of physical object consisting of a number of unique properties. In Leslie's view, these are mechanical, actional (or teleological) and cognitive (or intentional).

As we have just seen in Leslie's experiment, agents contain mechanical properties by virtue of having an internal and renewable source of energy or "FORCE." In other words, what makes an agent different from a physical object such as a hammer is that agents are conceived of as possessing something "inside" that makes them capable of using the hammer. One way of describing this special property of an agent is to view the agent as having an "essence" that a hammer does not. Hammers do not have an internal renewable source of energy. If hammers move, they move only by virtue of something else moving them. Tom picks up the hammer. The hammer just lies there unless moved by something. Agents move because they have something inside them that causes them to be capable of moving. It is as if they have a special hidden engine. And this internal resource is regarded as an enduring rather than as a momentary property acquired by contact with something else.

Mechanical properties, however, are not sufficient to conceptualize the notion of agents. Agents also have actional (or teleological) properties. They simply do not move, nor do they move simply because they have an internal engine; rather, they act by pursuing goals. Agents act according to purposes. The lion feels hungry and

wants some (gazelle) food. The lion's action of stalking the gazelle should be understood as purposeful action. And when we see the lion in action, we attribute to the lion this purpose. We know what the lion wants.

Finally, and most importantly, agents have cognitive (or intentional) properties, and their behavior is informed by such properties. To attribute intentionality to an agent is more than simply attributing purposes to the candidate for agency. Purposes are nonpropositional; they are not about anything. Intentions are propositional. So if the lion were capable of representing "The gazelle is good food and knows that I regard him as a possible lunch" propositionally, we would say that the lion is capable of having purposes with propositional content and, in fact, is attributing intentionality to the gazelle. Of course, human beings do this every day, both to themselves and to other people. They even do it to animals. People adopt what Dennett (1987) has called the intentional stance, and they attribute both to themselves and to others a "Theory of Mind" (ToM) (see Carruthers and Smith 1996). As Baron-Cohen and Swettenham say:

> One of the most important achievements of modern developmental psychology has been to draw attention to the universal and astonishing capacity of young children to mind-read; it appears incontrovertible that by four years of age children interpret behavior in terms of agents' mental states . . . they mentalize: they convert the behavior they see others perform, or that they perform themselves, into actions driven by beliefs, desires, intentions, hopes, knowledge, imagination, pretence, deceit and so on. Behavior is instantly, even automatically, interpreted in terms of what the agent might be thinking, or planning, or wanting. (1996, 158)

So what distinguishes the concept of agency from all of the other things in the world is that agents are physical, animate entities with renewable sources of energy, capable of acting according to purposes and with the capacity to attribute mental qualities to others.

Baron-Cohen (1995) has devised an even more sophisticated theory than Premack and Leslie by arguing that mind-reading, which is fundamental to the attribution of agency, involves the interaction of four separate systems. Agreeing with Tooby and Cosmides (Barkow, Tooby, and Cosmides 1992) that natural selection has produced a mind-reading system, Baron-Cohen proposes a theory of four mechanisms that underlie the capacity of mind-reading. These are an intentionality detector (henceforth ID), an

eye-direction detector, a shared-attention mechanism, and a theory of mind mechanism. Working through vision, touch, and audition, the ID is a perceptual device that interprets motion stimuli in terms of the primitive, volitional, mental states of goal and desire (Baron-Cohen 1995, 32). According to Baron-Cohen, to see anything animate moving, all that is required to interpret its movement is the attribution of goal and desire. X is moving because its goal is to go over there or because it wants something. Baron-Cohen argues that the ID is activated whenever there is any perceptual input that could identify something as an agent, or agent-like, for example anything capable of self-propelled motion.

Baron-Cohen (1995, 35 38) cites four sources of evidence for the ID: (1) Reddy's (1991) experiments demonstrating that infants respond to the distinction between a give and a tease, thus showing that they are sensitive to changes in an adult's goal; (2) Heider and Simmel's (1944) discovery that subjects anthropomorphize geometrical objects that move around by describing them in terms of the actions of agents; (3) Perret and his colleagues' (Perret and Mistlin 1990; Hietanen and Perrett 1991) identification of cells in the temporal lobe of the monkey brain that respond selectively to the sight of another animal facing forward; and (4) Warrington and Shalice's (1984) discovery that some patients with focal brain damage lose the ability to employ the distinction between animate and inanimate objects.

The second mechanism that Baron-Cohen proposes is the eye-direction detector (henceforth EDD). Working only through vision, the EDD detects the presence and the direction of eyes or eye-like stimuli, and it infers that if another organism's eyes are directed at something, then that organism sees that thing. Baron-Cohen regards this function as particularly important because it permits the infant to attribute perceptual states to other organisms (1995, 38 39). The evidence for such a mechanism comes from the work of psychologists such as Daphne Maurer and her colleagues (Maurer and Barrera 1981, 39) who found that two-month-old infants looked almost as long at the eyes as at a whole face, but they looked far less at other parts of the face. In addition to detecting eyes, infants also are capable of detecting the direction of the eyes, i.e., what the eyes are looking at. Six-month-olds look longer at someone looking at them than at someone looking away. The EDD also is capable of interpreting eyes looking at the subject as eyes "seeing" the subject,

i.e., whether the eyes are "looking at me" or "looking at not-me" (Maurer and Barrera 1981, 43).

These two mechanisms, the ID and the EDD, can construct dyadic representations such as agent wants X, agent has goal Y (in the case of ID); and agent sees X, and agent is looking at Y (in the case of EDD). From Baron-Cohen's point of view, they are not, however, sufficient to account for more complex representations such as agent A sees that agent B sees X. For such a representation Baron-Cohen argues that we need a shared-attention mechanism (henceforth SAM).

The SAM builds triadic representations that specify the relations among an agent, the self, and a (third) object, which can be another agent. Such triadic relations would have the form of "agent sees that I see X" or "you and I see that we are looking at the same object" (Baron-Cohen 1995, 45). Baron-Cohen adduces as evidence for the SAM, which is obviously dependent on the EDD, the gaze monitoring typical of nine-month-old infants (Scaife and Bruner 1975; Butterworth 1991). He claims that by fourteen months, children the world over engage in this activity. What happens is that the infant looks in the same direction as someone else looking at something and then it alters its gaze between the object being looked at and the person looking at the other object. Baron-Cohen also notes toddlers' finger-pointing behavior at this period of development. Evidently, the infant points with an outstretched finger at an object, then it alternates its gaze between the other person and the object at which the finger is pointed. Baron-Cohen argues that such behavior is effective in directing attention to a shared focal object (Baron-Cohen 1995, 48). The SAM, according to Baron-Cohen, also makes the ID's output available to the EDD. The importance of this is that it allows the EDD to interpret eye direction in terms of an agent's goal or desires.

Baron-Cohen postulates one additional mechanism, the theory of mind mechanism (henceforth ToM mechanism). Here, Baron-Cohen obviously is building upon the aforementioned work of Alan Leslie. Leslie's theory of agency distinguishes the mechanical, teleological, and intentional aspects of agency, but it does not contain the ID, EDD, or SAM mechanisms. Baron-Cohen believes that, while these additional mechanisms are necessary for developing an adequate account of the architecture of a theory of mind, they are not sufficient. A theory of mind also must involve the representation of

epistemic mental states such as pretending, thinking, knowing, and believing, in which agents are represented as having attitudes towards propositions. It also must turn all of this mentalistic knowledge into a theory uniting mental states and actions.

As evidence for these two functions of the ToM mechanism, Baron-Cohen appeals to the large number of studies showing the emergence of children (eighteen to twenty-four months) pretending and also recognizing the pretence of others. By thirty-six to forty-eight months, children understand "knowing" and that it is the product of perception. By this time, they also have begun to recognize false beliefs, i.e, they have begun to understand the difference between believing that something is the case and believing that something is the case when it is not the case.

Baron-Cohen also appeals to neurological evidence for his theoretical claims. He asserts that there is evidence that the ID may be localized in the superior temporal sulcus (STS), and that Perret *et al.* (1991), on the basis of single-cell recording, report that some cells in the STS fire significantly more often when the animal in the test observes an agent doing something. He says that these cells can be regarded as part of the ID because almost any detection of action will involve attributing a goal or desire to an agent (Baron-Cohen 1995, 93). According to Baron-Cohen, Perrett and his co-workers also report having found cells in the same region of the cortex that respond to self-propelled motion, which, as we have already seen, Premack emphasizes is a fundamental property of the attribution of agency.

OTHER VOICES

The psychological news discloses, then, that the requisite cognitive equipment for the representation of agency, namely an ARS, is in place very early on, if not at birth. This does not mean that such notions are necessarily coded in the genome. What is innate, and what is meant by "innate," are very complex issues, and we do not intend to resolve them here. It is sufficient for us to acknowledge that a number of scholars are rethinking innateness. For example, connectionists such as Elman *et al.* argue:

> We are prepared to call many universally recurring patterns of behavior in languages, for example innate even though we find them nowhere

specified directly in the genome. In this sense, our definition of innateness is undoubtedly broader than the traditional view. We also believe that it is richer and more likely to lead to a clearer understanding of how nature shapes its species. (1996, 46)

No matter what the underlying account of innateness is, what does interest us is that experimental work shows that infants have the ability to represent agents and their actions distinctively and that they do so early in development. For example, infants seem to have the ability to detect conspecifics at a very early age. In fact, Meltzoff and Moore (1977, 1983, 1989, 1992) argue that the ability to recognize faces is present at birth.

As we have already pointed out, Premack (1990) not only asserts that infants have the ability to distinguish self-propelled objects from non-self-propelled things, but he also argues that they have different expectations concerning the behavior of these two categories of things. For example, infants are not surprised to see a ball move when it is hit by another ball, but they are very surprised when a ball moves by itself. They appear to know that simple objects will move only when they have been contacted by another moving object, and that other physical objects such as human beings not only can move themselves, but they also can get other human beings to move without making direct contact with them. It does not take too long for infants to know that they can get mother to act simply by vocalizing, whereas other things in their environment, which are not agents, move only when they are touched.

Such research shows that young children have command of distinctions between agents and everything else well in advance of being able to articulate such distinctions. This suggests that we are dealing with a form of knowledge that is tacit. How such implicit knowledge is acquired is a fascinating question in its own right, and whether connectionists are developing the kinds of strategies for finding interesting answers other than simply attributing such abilities "to the genes" is an exciting avenue of research. Nevertheless, we would be remiss if we did not record that connectionist strategies have demonstrated that some representations are likely the inevitable outcomes of minor variations on general network models of learning. The distinction that such researchers employ is between architectural and substantive innateness. Architectural innateness refers to the way in which neural networks are organized such that they are predisposed to respond to certain kinds of information

rapidly and efficiently. Substantive innateness argues for the presence of ideas in the mind at birth because they are the products of a process that originates due to genetic encoding.

To conclude this section, we ought to note that it is possible to be skeptical about our emphasis upon agency generally and on CPS-agents in particular. Or to put it another way: even if all of this information about agency is true, what does that have to do with theorizing about religion? One line of attack could focus upon theological thought and argue that within at least some religious traditions, the focus of the religion seems to be notions that transcend agency. For example, some philosophical theologians have developed highly abstract notions such as "Being-itself" as central notions in the conceptual schemes of particular religious traditions. Our potential critics might be tempted to argue that if such theologians were correct, then CPS-agents would not deserve the attention that we have afforded them in our theory. Another line of attack could call attention to religious traditions such as Buddhism in which notions such as *nirvāṇa* are central, not agency. Another line of attack, e.g., the "God is dead" movement, "secular city," etc., could point to the attempt of some religious thinkers to focus upon ethical norms rather than agency.

My answer to such possible objections takes two forms. For the sake of argument, I am willing to bite the bullet and argue that I am talking about situations in which groups of individuals seem to share representations about superhuman agents and are mutually involved in a system of practices that are informed by such representations of agency. If our critics do not wish to call such ideas and the practices they inform "religion," we can live with that. Nevertheless, I have proposed a theory that accounts for a widespread set of phenomena found in many different cultures throughout human history.

My second answer involves the significant findings of those scholars such as Stewart Guthrie (1993, and this volume) who have studied the widespread phenomenon of anthropomorphism from an anthropological perspective. Furthermore, there are have been important experimental findings (Barrett and Keil 1996; Barrett) that point to a basic human tendency to anthropomorphize, not only features of the natural world, but also the concept of a superhuman agent itself. We shall discuss both of these approaches below.

THE RELEVANCE OF THIS RESEARCH FOR RELIGIOUS REPRESENTATIONS

For our purposes, it suffices to identify the early forms of knowledge that very young children seem to possess and to show the importance of this fact for understanding agency in religious ritual contexts. Because our theory focuses upon the central role that CPS-agents play in religious ritual representations, it is open to theoretical and experimental support from those investigations in cognitive psychology that are concerned to discover and elaborate upon core notions such as agency. In our earlier work (1990), we have made the claim that religious representations are dependent upon our ordinary systems for the representation of action. Work in the psychology of agency should, therefore, provide some clues concerning the psychology of religious agency, since the notion of agents with special qualities (only the content of which is defined by conceptual schemes in specific cultural situations) is parasitic upon our ordinary notions of agency.

I shall discuss first how our cognitive equipment is activated by certain stimuli in such a manner that they generate religious representations of CPS-agents. The first bit of evidence comes from the study of the widespread human predisposition to trade heavily in anthropomorphism. Humans not only have the capacity to detect other human beings at an early age and are able to distinguish them from all other things, but they also seem to be addicted to seeing human forms even when they are not really there. They have touchy Agency Detection Devices (ADD). Here, Stewart Guthrie (1993, and this volume) has shown how widespread anthropomorphism is. Humans see faces not only in the clouds, but also on the surface of Mars, in abstract patterns, in artifacts, in just about every conceivable kind of thing. "Faces and other human forms seem to pop out at us on all sides. Chance images in clouds, in landforms, and in ink blots present eyes, profiles, or whole figures. Voices murmur or whisper in wind and waves. We see the world not only as alive but also as humanlike" (Guthrie 1993, 62).

Guthrie also points to the anthropomorphic character of religion.

> People who say religion is anthropomorphism usually mean one of two different things: either that it attributes human characteristics to gods or that, in claiming gods exist, it attributes human characteristics to nature. In the former meaning, religion makes gods humanlike at least in crediting

them with the capacity for symbolic action. In the latter, which is what I mean, religion makes nature humanlike by seeing gods there. (Guthrie 1993, 177)

From Guthrie's point of view, the fact that religions postulate gods with humanlike qualities is less important than the fact that religious representations depend upon anthropomorphic representations. These representations simply are one way of interpreting the world around us by imposing human properties upon various objects in the environment.

Guthrie has documented the pervasiveness of the human tendency to anthropomorphize. Cross-cultural studies show that anthropomorphism is pervasive and recurrent. But Guthrie is more interested in interpreting what people are doing, i.e., describing nature anthropomorphically, than in accounting for such a tendency in cognitive terms. Or to put it another way, Guthrie has not theorized about the cognitive mechanisms involved. He simply assumes that they must exist. One of the points that Guthrie misses is that people do not only anthropomorphize what they see, i.e., they do not only attribute agency to various aspects of the natural world, but they also attribute agency to that which is behind the world we see, i.e., to the world that is hidden from our senses.

Barrett and Keil (1996) show that even when people possess conventional ideas about the gods, e.g., the gods know everything, can be everywhere at once, are all-powerful, etc., they nevertheless have a tendency to think of the gods in anthropomorphic rather than abstract theological terms. Barrett and Keil have devised experiments to show that even when human beings possess complex theologies and are capable of sophisticated talk about the counter-intuitive properties of the CPS-agents in such theologies, and even when they have lists of concepts applicable only to such entities, e.g., omniscience, omnipotence, and omnipresence, nevertheless, when they are required to engage in reasoning about the gods referred to in those theologies, in the midst of larger cognitive tasks, they do not integrate such theologically elaborated formulations into their on-line reasoning about the gods. Instead, their reasoning relies on more everyday, anthropomorphic conceptions of these agents. Such gods do not know everything, are not omnipotent, and they cannot be everywhere at once.

Barrett and Keil examine the representation of non-natural entities such as God by testing their subjects' comprehension of

narratives. In one experiment, Barrett and Keil tell the subjects a story about a boy who is swimming alone in a river and becomes entangled in some rocks with no possible means of escape. Fearing that he will drown, he begins to struggle and pray. God is answering another prayer in another part of the world but before long responds to the boy's prayer by pushing one of the rocks so that the boy can free himself. The boy escapes to the bank, exhausted yet free. The subjects, after having heard the story, are asked a series of questions. Their answers reveal that the subjects misremembered the stories in an anthropomorphic way. For example, they remember wrongly that God stops hearing one prayer in order to respond to another. But Barrett and Keil do not speculate about what kind of cognitive mechanism is at work other than to distinguish between on-line and off-line cognitive processing, i.e., explicit, reflective, conscious reasoning as opposed to implicit, non-reflective, non-conscious inference.

Pascal Boyer (1994) has furthered the analysis of the role that agency plays in religious thought through his elaboration of the intuitive ontologies that all human beings employ in their common-sense reasoning. An intuitive ontology is a "theory" of the kinds of things that there are in the world. It consists of a set of categories containing such notions as persons, animals, plants, physical and artificial objects, and a set of default assumptions about these categories. For example, plants are physical objects that do not have minds but are capable of various biological processes such as growth and death. Being in command of such an ontology automatically makes available to each person sets of inferences that accompany the deployment of the categories. In such an intuitive ontology human beings, for example, are represented as agents possessing the properties of intentionality, animacy, and physicality. We may call these the default assumptions of the notion of a person. Other categories in these intuitive ontologies are "animal," "plant," "artificial object," and "physical object." Boyer maintains that such notions are part of our standard cognitive equipment and are regularly deployed in our day-to-day cognitive traffic with the world.

Boyer is particularly concerned with the cognitive dynamics of the cultural transmission of religious concepts. He wants to show how such standard cognitive equipment can yield surprising results when the default assumptions of the various categories are violated. Violation of the default assumptions associated with the ontological

categories takes two forms, either via a breach of one of the default assumptions of the category in question, or a transfer of one of the default assumptions to another category. For example, breaching the assumption that a person has a body, i.e., violating the default assumption of a person's physicality, yields the representation of a person who has a mind and is alive but has no physical properties. As we all know, many religions contain the notions of angels, spirits, gods, ghosts, and "powers" that can think, plan, punish, and cajole; these entities are very much alive, yet they are disembodied.

Besides breaching the assumptions associated with a category, there is the additional resource of transfer available to generate out-of-the-ordinary or counterintuitive concepts. Transferring properties from one category to another also is available for religious purposes. For example, transferring intentional properties to objects not normally thought to possess them, e.g., artifacts, or even naturally occurring objects such as mountains, trees, or animals, yields the sorts of concepts that regularly occur in religious conceptual systems. Attributing the property of intentionality to a statue, for example, generates the concept of a statue that can read our thoughts or deliver secret information to us. Attributing the property of intentionality to a divining board generates the concept of an artificial object that can predict our future.

The discipline of comparative religion has produced volumes about religious conceptual schemes replete with such notions. What Boyer intends to demonstrate is that such counterintuitive notions are memorable and are, therefore, more easily transmitted culturally. But there are definite constraints on transmission. The counterintuitive features of notions that contain violations of the default assumptions of the categories must exemplify a cognitive optimum with the intuitive features, i.e., features that are simply taken for granted. Too much violation leads to overkill; too little leads to boredom.

In analyzing our susceptibility to including agents with special qualities in our religious representations, Boyer has noted that, in order to make religious representations memorable, we need a bit of the exotic or counterintuitive thrown in. His notion of the cognitive optimum is interesting because it shows that there is an optimum between schematic and non-schematic ideas that, when reached, makes it more likely that such ideas will be transmitted.

Recently, Boyer (1998) has subjected some of these claims to

experimental tests. Boyer devised three studies that employed free recall and questionnaires to test the recurrence of counterintuitive representations in religious concepts across cultures. Recall data generated by the tests supported Boyer's hypothesis that counter-intuitive materials are recalled better than standard items and, therefore, may be more easily transmitted, resulting in cultural spread and stability. Perhaps Boyer's most significant finding is that cultural transmission is not simply a function of bizarreness. Instead, particular combinations of categories and properties are required for transmission. It appears that Boyer has shown that not everything odd goes through; "oddness" comes in different forms, only some of which are transmittable.

The early availability of these cognitive resources shows why explicit instruction is not prominent in the acquisition of such notions. Such cognitive resources arise quite naturally in the course of human cognitive development. Representing the world via such processes as violation and transfer comes so easily to us. Our minds are prepared to traffic in agency. Superhuman agency simply adds special qualities to the standard notion of agents with mechanical, teleological, and intentional properties. When we think about the gods as agents capable of acting for our good or ill, our judgments are both constrained and enhanced by our intuitive ontologies. As Barrett and Keil say:

> The problem created by the ontological chasm between humans and the supernatural is solved by ignoring the difference. It appears we accept information about God quite literally. No longer is God a wholly different being, inexplicable and unpredictable. God is understood as a superhuman and likely to behave as we do. The problem is addressed by creating God in the image of ourselves, and using the constraints of nature and humanity as our basic assumptions for understanding God. So it appears that the God of many people is not quite so different from Zeus as it might at first seem. (1996, 244)

COGNITIVE EVIDENCE FOR RELIGIOUS AGENCY

If it is the case that human beings easily postulate CPS-agents and the actions they perform, then we need to determine the features of this susceptibility. It should be clear by now that we think that the susceptibility to religious agency is parasitic on the susceptibility to agency itself. We are capable of thinking of agents with special

qualities because we are predisposed to think of agents with ordinary qualities. A number of cognitive scientists provide expert guidance on this matter. Frank Keil (1979) argues that in normal conceptual development, human beings who normally avoid predicate spanning, i.e., applying predicates applicable to one ontological category to another, have no qualms under certain conditions about extending features that are characteristic of one category to another. For example, normally we know that if something is made of metal, such as a watch, then we would not predicate the ability to breathe to it. So if someone says, "My watch is snoring," we either think they have made a category mistake or that they are making a metaphorical statement meaning, for example, that the watch is ticking very loudly. The point is that we know it if people are engaging in the act of predicate spanning. When we engage in predicate spanning, we find ourselves in the world of metaphor and myth. In fact, focusing upon "breaking the rules" of predicate attribution opens the windows of cognition to the contents of the conceptual schemes of humankind's religions.

As we already have seen in the work of Boyer, religious ideas are filled with the notions of persons without bodies, beings who live forever, animals that predict the future, statues that record and transmit information, etc. Perhaps what is most intriguing is that such cognitive activities are not only widely distributed in space and time, but they also seem to start at a very young age in every generation, often to the despair of atheistic parents bothered by the gullibility of their children.

The predisposition to employ the concept of religious agency also can be understood by looking at work in social psychology. Attribution theorists have mounted evidence concerning the role that agency plays in human judgment. In fact, it seems to be the case that human beings have the propensity to overextend attributions of agency even when the situation does not require such attribution (Ross 1977). What is involved here is not so much the error of over attribution as it is the preoccupation that humans seem to have with agent causality. Conspiracy theories abound. Blame is placed even when it is not required. Human beings' preoccupation with agent causality typically results in their underestimation of the role of the environment and their overestimation of human responsibility and the role of personality traits when assessing the causal dynamics of social events. When the chips are down, it seems to be easier and

more efficient to credit human agency in making social judgments than it is to find underlying causes. The process of identifying hidden causes is far more difficult and far more costly for humans generally (McCauley 1998).

Historians and philosophers of science who are concerned to specify what is involved in the growth of knowledge also have paid attention to the notion of agency and specifically to how religious agency has often, in fact, frustrated the development of scientific theorizing. Paul Churchland (1989) argues that as our knowledge of the world increases, attributions of agency retreat. But he also acknowledges that attributions of agency have played an important role in folk psychology throughout human history.

Of course, while it may be true that scientifically minded people are slowly beginning to abandon the range of the application of agency, it is not at all obvious that it is true of our on-line mode of reasoning, as Barrett and Keil have demonstrated. Reasoning in terms of agency is efficient in dealing with the world, and the appeal to superhuman agents is a powerful strategy in explaining unexpected results. Operating theaters are filled with claims of miracles! Whatever forces may contribute to such representations of agency, human cultures are pervaded by them, and they seem to spread by contagion. Anything that spreads so easily needs to be accounted for.

How then do the various types of information referred to above fit with our theory of religious ritual? We have argued that religious ritual participants possess a system of implicit knowledge by means of which they make judgments about ritual form. They not only make judgments based upon the Principle of Superhuman Agency (henceforth PSA), but also on the basis of the Principle of Superhuman Immediacy (henceforth PSI). The PSA requires that superhuman agents must be represented somewhere in the system of ritual representation. The PSI requires that where in the system the agents appear makes all the difference about the kinds of judgments that religious participants will make. Not only are religious participants capable of detecting agents (agency detection device [ADD]), but they also are capable of attributing the special qualities that such agents must possess in order to be efficacious.

For example, religious participants seem to know that in order to become initiated into the sacred traditions of the group, they must be subject to the actions performed by agents in order for the initiation to prove efficacious. But they also seem to know that these

agents must possess special qualities for them to accomplish the jobs they need to accomplish. In a particular case, these agents may be the elders, but these elders may perform the initiation rites only because they, in turn, have been initiated by an earlier set of elders who were initiated. This explains the advent of superhuman agents, since the buck stops with the gods. The system of implicit knowledge with which religious participants operate in particular situations makes available to them a set of inferences about who is qualified to perform what rite, what agents must be present in order for the rite to be performed, what actions must be performed in order for the rite to be successful, what agents must perform the rite, what qualifies one to be a patient in such a situation, what distinguishes a successful action from an unsuccessful one, and so on. The cognitive mechanisms in place enable ritual participants to know the difference between an agent, an action, and a patient, and to know the means by which the action is performed. Ritual participants also know implicitly the special qualities that agents and/or patients should possess in order for the ritual to accomplish its objectives.

Such predictions about the judgments that religious participants will make about ritual form raise empirical questions. In recent work, Barrett and Lawson (in press) have designed a set of experiments to test three empirical predictions: (1) individuals unfamiliar with a particular ritual, religious system still will have converging intuitions about whether or not a particular ritual is well formed; (2) ritually naive individuals still will appreciate the central importance of superhuman agency being represented somewhere in the ritual structure; and (3) subjects will judge having an appropriate agent for a given ritual most important to the success or failure of a ritual action.

The experiments by Barrett and Lawson directly tapped participants' intuitions regarding ritual structures by presenting fictitious rituals that were deemed well formed (because they were successful), altering these rituals, and then asking for relative judgments about what changes in the ritual would most likely undermine their effectiveness. The subjects were 68 students recruited from introductory psychology courses at a Protestant college in the United States. They ranged in age from 17 to 22 years old, with a mean age of 18.6 years. Forty were female, 28 male. A packet of 12 randomly ordered rituals sets was prepared. A prototype ritual was followed by 12 variations including a reproduction of the prototype. An example of

a prototype ritual was "A special person blew ordinary dust on a field and the field yielded good crops." The 12 variations of the prototype included (1) a version of the prototype with S-markers (references to agents with special qualities) in both the agent and instrument slots, for example, "A special person blew special dust on a field and the field yielded good crops," (2) a version with an S-marker only in the agent slot, (3) a version with an S-marker only in the instrument slot, (4) a version with no S-markers but otherwise identical to the prototype, (5) a minor agent change (to an animal) with S-marker, (6) a minor agent change with no S-marker, (7) a major agent change to (to an inanimate object) with an S-marker, (8) a major change without an S-marker, (9 and 10) two action changes otherwise identical to the prototype, (11) an instrument change with an S-marker, and (12) an instrument change without an S-marker. Participants were asked to rate on 7-point scales how likely each of the changes was to account for the failure of the second ritual, i.e. which changes were important in undermining the effectiveness of the ritual. A low score meant that it was extremely likely that the ritual would work, 7 meant that it was extremely unlikely for the ritual to be effective.

The results of the experiment were encouraging. As predicted, the two marker items (items marked by the presence of agents with special qualities) were rated significantly lower than the other marker items. (M[Median]=2.00 compared to the next closest type of marker item.) The two S-marker items even differed significantly from the no-marker items when the prototype had no S-markers and so the no-marker choices best approximated the successful actions. The two forms of one-marker items did not differ significantly from each other but had significantly lower average ratings than the no-marker items (M=3.06 for the S-marker in the instrument slot; M = 4.65 for the no marker items.) The two one-marker types did not differ significantly from the no-marker items when the prototype had no S-marker. It seems S-markers do matter to subjects' judgment of the well-formedness, and therefore the effectiveness, of rituals even if S-markers are not necessarily included in the prototype rituals.

The second prediction regarding S-markers was that not having S-markers would damage the rituals' likelihood of success, more so than other changes such as action and instrument. Since some of the prototype rituals did not have S-markers, testing this hypothesis is muddied. By implicitly being told one-quarter of the time that S

markers are unnecessary, subjects may have devalued S-markers relative to other features. More importantly, in cases when the prototype had no S-markers, the no S-marker item does not constitute the removal of S-markers, but is a reiteration of the ritual that supposedly worked. To minimize these difficulties, the measure chosen to represent the importance of S-markers in the ritual structure relative to other components was the average of no S-marker items only in cases when the prototype had at least one S-marker. In these cases, the no S-marker condition truly indicated the removal or absence of an S-marker. As predicted, this "S-marker absent" score was greater than either the action or instrument scores. The mean "S-marker absent" score was 5.26 as compared with 3.60 for action changes, and 4.39 for instrument changes. Subjects' intuitions even converged on agent changes being less important for ritual success than the presence of S-markers. Agent change items had a mean rating of 4.71.

Consistent with the predictions regarding agents, agent changes with and without S-markers were rated as more damaging to the possible success of the rituals than action changes. Agent changes with an S-marker ("special" agents) had a mean rating of 4.29 which was significantly different than instrument changes. Agent changes without an S-marker were judged as even more likely to ruin the rituals (M=5.12) and were rated significantly different from both action changes and instrument changes.

Subjects, ratings indicated that if a ritual gives no indication that the agent or instrument involved has been endowed with special properties or authority by a divine source (removing S-markers), then it will not bring about the desired non-natural consequences. The representation of agents with special qualities somewhere in ritual structure was judged as more important for the success of the ritual than using the original instrument of performing the proper action. Subjects' ratings also suggest intuitions that more than one indication of superhuman agency in the action structure is better than only one. Finally, in these religious actions, subjects' intuitions were that having an agent capable of intending a particular outcome was more important than performing a particular action. Changing an action was not as devastating to the intended consequence even if the agent was performing the appropriate action.

To sum up: the results of the experiment confirmed the first prediction by showing that two S-markers were better than one, and

that one was better than none. They also confirmed the second prediction by showing that not having S-markers would more likely damage the efficacy of an action than either action or instrument changes. And the results confirmed the third prediction that changes in the agent slot were more damaging than changes in any other aspect of the ritual structure.

These two experiments were designed to test three general predictions in Lawson and McCauley (1990): (1) that people have converging intuitions about the efficacy, i.e., well-formedness, of rituals; (2) that when judging the efficacy of a ritual, superhuman agency will be more important than any other aspect of ritual; and (3) that people will regard having an appropriate agent as relatively more important than the particular action involved. The strategy employed by Barrett and Lawson to test these predictions involved tapping people's intuitions by presenting them with fictitious rituals identified as effective, altering their form in specific ways, and then asking the subjects to make relative judgments about what kind of changes in the presented rituals would most likely undermine their effectiveness. The results of the experiments supported all three predictions.

Rather than guessing at random, which would have produced mean ratings around the mid-point of the scales, the subjects, who were unfamiliar with the fictitious rituals, seemed to possess converging intuitions about what in the ritual structure was most important for each ritual's success. The subjects also seemed to understand that for an action to produce special consequences, superhuman agency must be involved in some way, and that a connection with superhuman agents is the best predictor of success. Rather than simply rating the rituals that best matched the prototype as most likely to be effective and ignoring the importance of S-markers, the subjects recognized the importance of superhuman agency. They favored ritual forms with "special" agents or "special" instruments when "specialness" was defined as having been endowed with unusual properties from the gods. And, finally, participants' intuitions converged on the point that having an appropriate agent for a ritual is relatively more important than the specific action involved. Having an agent that does more than merely perform the action but also intends the consequences of the action is more important than the actions themselves in determining the efficacy of the action involved.

A theory about religious ritual intuitions, then, is empirically

tractable and capable of being tested to highlight the role that ritual intuitions with noncultural foundations play in making religious ritual judgments. This means that a cognitive psychology of religion may begin to demonstrate that, in order to connect the cognitive and the cultural, it is worth focusing upon the noncultural foundations of religious ideas and the practices they inform.

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CHAPTER 7

Do children experience God as adults do?

Justin L. Barrett

Concepts organize experiences, including religious experiences (Boyer 1994). The reason so many "religious" events and ideas seem radically different from ordinary experiences is that they violate a few default assumptions about things in the world. For example, a religious person who can never die is bizarre because never dying challenges the concept of "person," even if the person is a religious figure. Note, however, that if the vast majority of our assumptions about persons do not apply to this religious person who cannot die, this being would not be identifiable as a person, and a non-person never dying is not necessarily very interesting.

Ordinary conceptual structures also shape experiences of religious actions such as rituals. While religious rituals may be attributed multiple levels of meaning, and while they present a hermeneutic problem to even the most savvy participants, ritual actions are still actions that have manifest similarities with all other actions (Lawson and McCauley 1990; forthcoming). A ritual drummer ritually beating a ritual drum is still a drummer beating a drum. The relationship between the drummer and the drum is only clear because of an understanding of action events. In these and many other ways, concepts structure religious ideas and experiences. Perhaps the most important concept impacting on religious life is the concept of intentional agency (Lawson; Lawson and McCauley 1990). After all, the vast majority of the world's religions, if not all of them, center on the actions of special intentional agents such as gods. Given the importance of these agents and the important role concepts play in shaping these agents' experiences, understanding how agents are conceptualized throughout development is essential for a complete understanding of religious experience.

This chapter begins by summarizing some traditional accounts of how gods are experienced and conceptualized from childhood

through adulthood. It then presents some contemporary research pertaining to children's and adults' representations of superhuman agents, and it suggests how the commonly held developmental shift from anthropomorphism to abstraction may be modified in light of recent empirical and theoretical developments in cognitive science. Specifically, children and adults need not elaborate a human concept, i.e., they need not anthropomorphize, to make sense of gods; instead, they may use a more "abstract" agent concept. Contextual cognitive demands determine in part how anthropomorphic this agent concept is, in both children and adults. Consequently, the data cited to support the anthropomorphic-to-abstract shift through development may be understood better as a shift from poor to better general processing abilities and not as a more qualitative change in the type of concept used. The chapter concludes with implications for religious research and religious experience.

DEVELOPMENTAL ACCOUNTS OF GOD CONCEPTS

> Once upon a time in Heaven . . . God woke up from his nap. It was his birthday. But nobody knew it was his birthday but one angel . . . And this angel rounds up all these other angels, and when he gets out of the shower, they have a surprise party for him. [Carin, age 9] (Heller 1986, 46)

> God is infinite, pervasive, and man finite and limited to a locality. Man cannot comprehend God as he can other things . . . God is without limits, without dimensions . . . How can a limitless, infinite being be contained in the mind of a limited being like man? (Ullah 1984, 19)

These two quotes nicely illustrate what psychologists of religion typically describe when discussing the development of god concepts: a radical shift from crudely anthropomorphic concepts in childhood to the dizzyingly abstract concepts of adulthood. Since the beginning of the twentieth century, psychologists studying how gods are experienced or represented in the minds of developing individuals periodically reformulate god concepts in the leading theories of the time, e.g., Freudian, Piagetian, and object-relations theories. Despite the changes in theoretical perspective, all schools of thought either implicitly or explicitly affirm one central observation from their inception, gods are fundamentally experienced anthropomorphically, and through development, they become increasingly less anthropomorphic. That is, crude, physical anthropomorphism, e.g.,

God as a big person living in the sky, gives way to God as an abstract being with unusual properties such as formlessness, atemporality, omnipotence, and omniscience. With some interaction, discussions of developing god concepts come in two basic flavors, cognitive and relational. Following Piaget's lead, cognitive accounts primarily deal with the cognitive limitations people have at various stages of development and what these limitations mean for the physical, biological, and psychological attributes incorporated in superhuman concepts. Relational accounts, initiated by Freud, typically say little about physical or biological attributes; similarly, they say little about fundamental psychological properties, but they explore instead personality traits and dispositions attributed to divine beings.

Piaget saw concepts of God inextricably connected to children's understanding of their parents. Rather than this relationship being cashed out in terms of the psychological need to project a protecting parent figure (Freud 1961 [1927]), Piaget emphasized children's cognitive representations and understandings of their parents and the origins of the world (Piaget 1929). For Freud, God is a surrogate parent needed to diffuse anxiety. For Piaget, God is a parent who fulfills cognitive needs. Both understood children's concepts of God to be based upon anthropomorphism of a "crudely physical kind" (Goldman 1964).

Piaget's discussion of god concepts drew from two primary observations. First, Piaget noted that many children seven years old or younger seemed to believe that the natural world has been created by human beings. He termed this phenomenon "child artificialism" (Piaget 1929). Children he interviewed reported that lakes, clouds, rocks, and other natural things were both younger than humanity and created by humans. Second, Piaget believed that children younger than about seven endow their parents and other adults with the properties of omniscience and omnipotence. As evidence, Piaget cited the "crisis" children reportedly face when they find that some things are outside of their parents' control or knowledge. Until children outgrow this stage and begin to appreciate human fallibility, God is just another human: "He is just a man like anyone else, who lives in the clouds or the sky, but who, with this exception, is no different from the rest" (Piaget 1929, 381). After children understand that humans do not, in fact, possess God-like properties, God is left as the only member of the pantheon. God is thus a residual of childhood naïveté supported by theological

instruction. The child begins by attributing the distinctive qualities of the divinity especially omniscience and almightiness to his parents and thence to men in general. Then, as he discovers the limits of human capacity, he transfers to God, of whom he learns in his religious instruction, the qualities which he learns to deny to men (Piaget 1929, 268).

Even when children make this transfer of properties, Piaget insists that the child's concept is still anthropomorphic. God may be omnipotent and omniscient, but God still is imagined as a man who lives in the sky, with human physical properties. Under Piaget's theory of cognitive development, children simply do not have the faculties to deal with a more abstract concept of God until they pass out of the stage of concrete operations, sometime in early adolescence (Gorsuch 1988; Piaget 1929). Consequently, concepts of God begin as crude anthromorphisms, but by adulthood, they become abstract.

Several theoretical works have incorporated Piagetian thinking into the exploration of developing god concepts (e.g. Elkind 1970; Goldman 1964, 1965). Likewise, many empirical studies have produced evidence of the concrete-to-abstract shift, using interviews with children and young adults (Pealting 1974; Tamminen 1991); asking children to draw pictures of God (e.g., Pitts 1976); and asking children to write letters to God (e.g., Heller 1986). However, some of these tasks may bias children towards anthropomorphism (Petrovich 1997). Repeatedly, the Piagetian notion that "the term God for a young child is likely to mean big person" (Paloutzian 1996), echoes throughout the literature. Compare Heller's description of young children's concepts to Goldman's case study of a four-year-old, some twenty years earlier. The youngest group of children, ages four to six, illustrate a largely single-minded conception of a deity, a being who acts and appears in a quite literal rather than an abstract sense (Heller 1986, 55).

> God is a man, wearing "a long sort of white shawl." He'd be a special sort of man, not like other men, and he'd have a kind face. Caroline feels God is everywhere and this is what is special about him because the world is physically an extension of himself . . . Caroline pictures God rather like a human magician. He has a powerful voice, "like thunder," which frightens people. (Goldman 1965, 14)

All of these cognitive approaches emphasize that children think of gods as merely special humans, and that because of cognitive

limitations, they can not think otherwise. They must think of gods as humans; "God" must mean "big person."

While dealing with facets of god concepts other than cognitive theories, relational approaches such as psychoanalytic, object-relations, and attachment theories typically emphasize a close connection between young children's understanding of their parents and their understanding of gods, though implicitly, these studies affirm the anthropomorphic-to-abstract shift emphasized above. For example, Freud referred to religion as "humanizing" the natural world and he viewed God as a super-father projected as a defense against uncontrollable powers of nature (Freud 1961 [1927]). Similarly, object-relations theorists have suggested that a person's experience or representation of God is caused by "experiences in reality, wish, or fantasy with primary caretakers in the course of development" (Rizzuto 1980, 123). Attributes of God are generated by specific features of children's relationships with their parents and modified during the course of development.

CHALLENGES TO THE STANDARD DEVELOPMENTAL THEME

The various developmental accounts all attempt to capture the same data children seem to talk about and depict God and gods primarily as humanlike, while adults often espouse fairly abstract, sophisticated ideas about gods. The standard anthropomorphic-to-abstract shift captures these data nicely. Nevertheless, as with a number of Piaget's conclusions, illuminating these data with more contemporary theoretical and empirical work from cognitive science reveals potential problems with the standard interpretation.

To begin, little attempt has been made to equate the tasks for relative pragmatic difficulties across ages, or to insure that comparable measures are being used at various ages. Perhaps the measures are simply more computationally difficult for children than for adults, but both have similar god concepts. While some cross-sectional studies have used the same interview method for children through adults (e.g., Tamminen 1991), much of the best evidence for physical anthropomorphism comes from asking children to write letters to God, draw pictures of God, and tell stories about God (Heller 1986).

These data then have been compared to adult responses to inventories, questionnaires, and other forms of self-reported beliefs.

Most, if not all, of the measures used for children are especially vulnerable to introducing bias and are not comparable to the typical measures used for adult god concepts. Would asking adults to draw pictures of God also yield anthropomorphic responses? Perhaps differences between the measures used with children and adults unfairly have maintained the anthropomorphic-to-abstract shift.

ANTHROPOMORPHISM IN ADULT GOD CONCEPTS

Indeed, recent experiments have uncovered some evidence that the degree of abstraction in adults' concepts of gods varies dramatically depending upon the measure used. Typically, in everyday contexts that demand using a god concept for rapid generation of inferences or predictions, the abstract, theological properties of gods that characterize reflective discourse disappear, a phenomenon termed "theological correctness" (Barrett 1998; Barrett and Keil 1996; Barrett and VanOrman 1996).

In these experiments, adult participants of several faith traditions in the United States and India were asked to use their concepts of the Divine to comprehend and remember short stories about "God" (in the United States), or about "Vishnu," "Shiva," "Brahman," or "Krishna" (in India). How participants misremembered the narratives to resolve ambiguities was taken as a measure of the god concept used. For example, one story mentioned a boy was swimming alone in a swift and rocky river. The boy caught his left leg between two large, gray rocks and he could not get out. Branches of trees kept bumping into him as they hurried past. He thought he was going to drown and so he began to struggle and pray. Though God was answering another prayer in another part of the world when the boy started praying, before long God responded by pushing one of the rocks so the boy could get his leg out. The boy struggled to the riverbank and fell over exhausted.

Subjects whose basic god concept is anthropomorphic could infer that God finished answering one prayer before attending to the boy. If so, they would tend to misreport that this is actually what the story said. Subjects using a god concept in which God performs many tasks simultaneously would be unlikely to recall that God finished answering one prayer before saving the boy. It is just as likely that God rescued the boy while answering the other prayer. The results of the narrative comprehension task suggest that when processing

stories, adults tend to use a concept of God having few abstract, "god-like" properties. Rather, participants quite readily attributed to God properties such as having a limited focus of attention, having fallible perceptual systems, not knowing everything, and having a single location in space and time. In contrast, when these same participants were asked to reflect slowly and carefully on what properties they believed God has, they reverted back to the theologically correct, abstract properties predicted by a Piagetian account God is all-knowing, has infallible perception, has no single physical location, has unlimited attention, and so forth. Similar behaviors occurred when college students paraphrased stories about "God" (Barrett and Keil 1996, Experiment 3). Participants' most common modification of the original stories was to create explicit, anthropomorphic properties of God. Slightly modifying the cognitive demands of the narrative comprehension task by reminding participants of their beliefs in theologically correct properties lessened the tendency to discard the theologically correct properties in favor of a more anthropomorphic concept.

Control experiments successfully ruled out artifacts of the narratives as the cause of the differences between self-reported concepts and concepts used to process the narratives. When "God" was replaced by a space alien with comparable god-like properties, and subjects were allowed to read and answer comprehension questions at their leisure, they were able to maintain use of the non-natural properties (Barrett and Keil 1996, Experiment 2). For example, having read, "Though Mog was answering another call for help in another part of the world when the boy started praying, before long Mog responded by pushing one of the rocks so the boy could get his leg out," subjects did not assume that Mog had to finish the first help request before turning to the other, but they allowed for Mog's ability to handle problems in parallel. When God is the agent, subjects assumed God only attends to one prayer at a time.

These data suggest that the processing demands of a context might, in part, influence how abstract, or cognitively cumbersome, a concept may be. Much as scientific knowledge is frequently pared down or abandoned in real time, everyday inference generation, theological concepts might be simplified for processing efficiency when needed (Barrett 1998; 1999). If true, then perhaps the reputed concrete-to-abstract shift in god concepts, as in other domains, is actually a matter of adults acquiring the cognitive tools to handle

complicated tasks more easily instead of being a revolution in how to assimilate reality (Rosch and Lloyd 1978; Flavell, Miller, and Miller 1993). Consistent with this conjecture, when given aids for reducing the processing demands of the narrative comprehension task, subjects less frequently reverted to anthropomorphic god concepts (Barrett and Keil 1996, Experiments 1 and 2).

But why does there exist this tendency to revert to simpler, more anthropomorphic concepts in the face of cognitive pressure? Advances in the field of cognitive development recently have implicated enormous stores of naïve or intuitive knowledge possessed by people of studied cultures by early childhood. This intuitive knowledge consists of the properties of different classes of things, e.g., artifacts, animals, persons, and different modes of causal explanation, e.g., mechanistic and social (Hirschfeld and Gelman 1994; Sperber, Premack, and Premack 1996 [1995]).

These elaborate cognitive structures bias the formation of concepts and the processing of information, even if concepts are fantastic or novel (Ward 1994). Once people identify something as an animal, they intuitively will assume that it was born, is developing, has nutritional needs, moves, has major sense organs, and has internal parts that make it go. They do not have to encode explicitly any of these properties; instead, they are a part of human naïve biological knowledge (Simons and Keil 1995). By filling in all of this information without having to determine it by experience, intuitive cognitive structures efficiently inform concepts. However, these structures also constrain concepts. If someone does happen across an animal that neither moves nor has major sense organs, he or she may fail to identify it correctly as an animal, or they may assume incorrectly that it does move.

Similarly, cross-cultural religious concepts are informed and constrained by intuitive knowledge (Boyer 1994). For example, since gods are intentional agents, willful initiators of action, the default assumption according to which they are conceptualized is intuitive knowledge about agents, or naïve psychology (Lawson and McCauley 1990). So it is no surprise that the basic concepts of participants in the experiments sketched above were found to reflect many of the assumptions of human agents the prototypical intentional agent.

Religious concepts only differ cognitively from ordinary concepts by a few minor violations of intuitive assumptions (Boyer 1994, 1996

[1995]). While making religious concepts more salient (Sperber 1994, 1996), these violations of intuitive assumptions strain processing systems. For example, intuitive knowledge of animals includes knowing that animals will eventually die and will struggle to stay alive. Encountering the concept of an animal that can never die disrupts intuitive thought about what motivates animal behavior. A normal animal threatened by mortal danger typically will flee or fight in order to survive. But what do we make of this new animal that cannot die? The uncertainties in predicting or explaining behaviors and characteristics presented by non-intuitive properties, i.e., the inferential gaps, compel us to undertake more complicated, more deliberate processing of information.

Increasing the cognitive burden of conceptualizing a thing by violating intuitive assumptions carries a price in all contexts, but it is especially serious when a situation demands quick and efficient interpretation, information gathering, or prediction. In processing tasks, such as a narrative comprehension task, concepts that have intuitive violations, as religious concepts often do, may be difficult to maintain consistently. Thus, many of the non-intuitive elements are likely to be ignored for the sake of processing efficiency. In slower reflective tasks that require commentary on instead of use of a concept, the non-intuitive features may be maintained. In the case of concepts of God, many theologies describe a God that violates many intuitive assumptions, e.g., an actor with no physical properties, an agent with no attentional or perceptual limitations, a "living" being that cannot die and is outside of time. These types of properties make for difficult inference generation in many everyday, information processing tasks. So, the theological god concept is simplified into something more manageable, i.e., a basic concept, with all of its mundane, intuitive properties, such as a person. In fact, god concepts may have foundations in perceptual and conceptual biases to attribute natural states of affairs to humanlike intentional agents (Guthrie). If so, that adult representations of God degrade into highly anthropomorphic concepts in certain contexts is unsurprising.

ABSTRACTNESS IN CHILDREN'S GOD CONCEPTS

If the alleged concrete/anthropomorphic-to-abstract shift in god concepts actually results from changes in general ability to deal with cognitive demands and does not result from a fundamental inability

in children to handle abstract concepts, then, in pragmatically simplified situations, children should demonstrate an "abstract" understanding of divine beings. That is, the feasibility of the counter-hypothesis rests on evidence that children indeed are able to use abstract, and more importantly, non-anthropomorphic properties, at least in some simple contexts. Fortunately, some of this evidence has been available for decades. Additionally, a growing number of experiments reveal that even pre-schoolers are not doomed to think of God as just a big person, as Piaget suggested and as his followers have maintained.

Ironically, Piaget noted that children's concepts of God did accept two seemingly abstract properties, omnipotence and omniscience. Both properties are abstract in the sense that they go well beyond observed regularities in the environment available to the perceptual systems of children. But Piaget did not view these properties as non-anthropomorphic until middle childhood, for he maintained that, until around age seven, children believed their parents and other adults to be omniscient and omnipotent. The power of humans was demonstrated by Piaget's finding that children believed the natural world was younger and was created by humanity (1929). More recent studies have challenged "childhood artificialism," finding that four- to seven-year-olds often report knowing that familiar natural kinds have nonhuman origins (Gelman and Kremer 1991), e.g., God included as one possible nonhuman origin. Four-year-olds seem to appreciate that when it comes to explaining origins, God is a different sort of agent than humans God makes natural things but not artifacts, and humans make artifacts but not natural things (Petrovich 1997).

When it comes to creative power, God is not so anthropomorphic after all. But what about knowledge? Contemporary research in the "theory of mind" literature of developmental psychology convincingly demonstrates that at least by five years old, and perhaps earlier, children understand that other people are fallible with regards to knowledge, sometimes holding to beliefs that are false (Perner 1995). For example, children at this age know that even though a cup is white, another person might incorrectly believe it to be blue (Moses and Flavell 1990).

However, recent experiments found no evidence that children transfer fallible beliefs to God (Barrett, Richert, and Driesenga, forthcoming). In a version of the commonly used "false-belief task"

(Wimmer and Perner 1983), three- to six-year-old Protestant children were shown an ordinary cracker box. Upon opening the box, children discovered, to their surprise, that it contained rocks. Children then were asked what their mother, who was not in the room, would think was in the box if she were shown the closed cracker box. Three- and most four-year-olds answered "rocks," indicating they did not yet understand that Mom could entertain incorrect beliefs. Nearly all five- and six-year-olds answered "crackers," knowing that Mom would be fooled by the appearance of the box. To illustrate, 18 percent of three-year-olds said their mothers would think crackers were in the box compared to 87 percent of six-year-olds. Thus there was a strong correlation between age and answering "crackers", r = .63. However, when asked what God would think was in the box, children at all ages were equally likely to answer "rocks," appreciating God would not be fooled by the appearance of the box. None of the three-year-olds and only one of nine six-year-olds said God would think there were crackers in the box, yielding no age-related correlation, r = .09. Thus, in an application of children's knowledge about others' knowledge, a clear difference in developmental patterns emerged between the "Mom concepts" and the god concepts.

In a related task (Barrett, Richert, and Driesenga, forthcoming), children were shown a cardboard box with a slit in the top and a flashlight affixed to the side. When the light was off, a colored block inside the box was invisible. Children looked inside the box, reported they saw nothing, and then the light was turned on, revealing the block. The experimenter turned the light off again and asked the children what Maggie (a girl puppet), a cat (who was specified as able to see well in the dark), a monkey, and God could see in the darkened box. Consistent with the previous experiment, older children were significantly more likely to report the Maggie (and the monkey) could not see the block in the darkened box, appreciating that just because the block was present did not mean it would be perceived. While 77 percent of three-year-olds reported that Maggie could see the block in the darkened box, only 36 percent of five-year-olds did so. In contrast, participants treated God and the cat as importantly different from either Maggie or the monkey. Of the three-year-olds, 92 percent answered that God would see the block and 77 percent said the cat would see the block. Similarly, 82 percent of the five-year-olds said God would see the block, whereas 91 percent said the cat would.

No correlation between age and God-answers was detected, $r = .08$. Inferential tests likewise detected no significant differences between the cat and God at any age. Once again, when using concepts to generate inferences, children embraced decidedly different properties for God as compared with humans.

Children clearly can entertain abstract and non-anthropomorphic properties of God. God does not mean big person. At least with regard to beliefs and perception, there is no good evidence that children think of God and humans as the same type of agent, which supports the need to separate "agency" from "anthropomorphism" as theoretical constructs explaining religion (see Pyysiäinen). Of course, Piaget predicted the finding that children would maintain God's infallible beliefs even when parents were found fallible, but Piaget assumed that realizing the fallibility of one's parents came several years later in development, and so he ignored this as counter-evidence to his claim that young children are wholly anthropomorphic in their representations of God.

CONCLUSIONS AND IMPLICATIONS

On one hand, adults use god concepts that are not always as abstract as is often assumed. On the other hand, children use god concepts that are sometimes less concrete or anthropomorphic than is often assumed. How can these findings be reconciled? Generally, the last two decades have seen numerous studies demonstrating that young children think in more abstract terms than was previously believed (e.g., Gelman and Markman 1986; Rochat, Morgan, and Carpenter 1997; Simons and Keil 1995; Spelke, Phillips, and Woodward 1996 [1995]). Additionally, what appeared to be qualitative shifts in how children reason in many domains may be better explained as acquisition of additional cognitive resources for solving problems (Flavell, Miller, and Miller 1993). The preceding discussion suggests that these two advances in cognitive development may be applied to the development of god concepts as well.

After all, general human cognition constrains all concepts, including religious ones (Barrett and Keil 1996; Boyer 1994; Lawson and McCauley 1990). Children do not necessarily proceed from completely anthropomorphic to abstract representations of gods. The developmental shift may not be so radical. Young children may have a concept of God that includes importantly different character-

istics than humans, including different mental properties and causal properties, but often appears humanlike because of the cognitive demands of a particular context, or because of religious instruction (Petrovich 1997).

Children's understanding of agency begins developing early in infancy. Already at three months old, children appear sensitive to the difference between something such as social causation and similar independent movement. Rochat and colleagues found that infants preferentially look at two colored circles "chasing" each other on a computer monitor over a control display with two independent moving circles matched for speed, changes in direction and average distance (Rochat, Morgan, and Carpenter 1997). Note that these are circles, not people, suggesting that concepts of intentional agency may not be tied to humans, even in infancy. By seven months, infants seem to appreciate that inanimate objects must be physically contacted to move, but agents need not be (Spelke, Phillips, and Woodward 1996 [1995]). By nine months, infants significantly dishabituate when the roles (who is chasing whom) are reversed in a display of "chasing" colored circles, suggesting some rudimentary understanding of the causal relationship being illustrated (Morgan and Rochat 1998). These studies are evidence that children understand something about the action of agents; that infants are sensitive to the difference between things with "self-propelledness" or "FORCE" (things that initiate their own action) and those without. Some theorists argue this distinction underlies early concepts of agents (Premack 1990).

The early agent concept must be combined with additional physical, biological, psychological, and social knowledge as the child develops to approximate adult concepts of human agency. However, it is also possible that the early agent concept may be elaborated with nonhuman properties to accommodate other intentional agent concepts such as sophisticated animals, gods, ghosts, angels, spirits, supercomputers, and space aliens. How anthropomorphic these other agent concepts become will in part be a matter of family resemblance, i.e., agents by virtue of being agents will have some properties in common, but it also will be a matter of instruction. Many religious traditions include explicit anthropomorphism, for example, the Christian Incarnation and Hindu forms of the Divine.

However, the presence of anthropomorphic instruction and the consequent anthropomorphic features in children's god concepts do

not entail that god and human concepts are one and the same. If anything, the available evidence indicates the opposite. Though the early agent concept may be elaborated in importantly different ways, thereby producing the spectrum of agents represented in adulthood, human agents do occupy a special role. No doubt, human concepts are the most detailed, complete, and rehearsed agent concepts. Consequently, in contexts that demand rapid inference generation, human concepts may be used to fill in the inferential gaps left by sketchier agent concepts. Similarly, specific attributes of an agent, for example, atemporality in a concept of God, may be used appropriately and effectively to generate inferences and predictions in some settings but be difficult to use in high demand contexts; therefore, these attributes may be bracketed, resulting in a more anthropomorphic concept. Fancier, less familiar, nonhuman properties are likely to be pared down when cognitive demands require it.

The ability to handle increased demands, and successfully to use less familiar properties in agent concepts, varies with cognitive maturity and expertise. Anthropomorphism in childhood agent concepts is likely due to children simply being less familiar with many nonhuman properties and less experienced in applying them. That young children so easily use the concept of infallible beliefs to make sense of God but not humans supports the claim that children can use non-anthropomorphic, abstract properties when they have enough experience using these properties. By adulthood, people handle cognitive demands with greater ease and therefore may embrace an abstract, non-anthropomorphic god concept more consistently, but they still are subject to cognitive constraints that may make God appear anthropomorphic. Given enough cognitive demands, even adults will retreat to more familiar, simpler concepts to generate inferences, even if this means using anthropomorphic properties for God that they reject theologically (Barrett 1998; Barrett and Keil 1996).

Of course, this proposal requires further experimental evidence to support it. Many studies with adults and children across cultures and faith traditions must be conducted before confident conclusions may be drawn. But the proposal helps clarify the issues and directs the type of experiments that should be done. Since concepts take on differing qualities depending on task demands (Barsalou 1992), the focal research question should not be "What are god concepts like in

children?" but "What are god concepts like in different contexts in children?" Similarly, one should not draw a developmental curve based on concepts generated from different tasks at different ages. Measures should be comparable in general cognitive demands for children and adults. Finally, just because a concept sometimes appears human, does not mean that anthropomorphism is the conceptual wellspring.

Rather than tallying humanlike properties in god concepts at different ages, a more appropriate and fruitful line of research would examine how general agent concepts develop and if there are important differences in developmental patterns between human agents and superhuman agents in the same contexts. For example, when human concepts are elaborated with knowledge of biological drives, are god concepts, or ghost concepts, etc., similarly elaborated? Once children understand that humans have stable personalities that partially determine behavior, do they likewise attribute personality to nonhuman agents?

That agent concepts, and thus superagent concepts, in both children and adults may be more variable than commonly thought, spawns several implications regarding religious experiences. First, if children are not bound to represent gods using a human concept, i.e., to anthropomorphize, this then implies that the possible ways children experience gods is more contingent on religious education and other environmental factors than has been argued in the past (e.g., Goldman 1964). In contexts of relatively low cognitive processing demands, children's understandings of gods may include many abstract properties that humans do not have.

Similarly, because both children's and adults' god concepts are limited by context demands in their cognitive complexity, i.e., how much they can deviate from intuitive knowledge structures, experiences of God may be highly variable within individuals, and across educational environments, theological traditions, etc. Finally, it may be that children and adults of a given tradition experience God quite similarly once context is considered. The revolutionary concrete-to-abstract shift may not occur over the course of development but instead may manifest from one situation to another.

Do children experience God as adults do? While more data are needed to draw strong conclusions, it appears reasonable to conclude that children experience God much more similarly to adults than is commonly thought.

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PART III

Embodied models of religion

CHAPTER 8

Cognitive study of religion and Husserlian phenomenology: making better tools for the analysis of cultural systems

Matti Kamppinen

What does Husserlian phenomenology contribute to the cognitive study of religion? In discussing the dominant methodologies in cognitive theory, I argue that neuropsychological approaches risk losing the cultural aspects of religion, while cultural approaches suffer from the lack of systematic tools and methods with which to study religious experience and the meaning systems involved. In contrast to many other phenomenologies of religion, the Husserlian tradition in phenomenology offers various systematic tools useful in studying the structures of religious meaning systems. Specifically, three important themes are the notion of the descriptive study of cognitive phenomena; the centrality of intentionality; and the theory of wholes and parts, a central component of so-called commonsense ontology.

THE COGNITIVE APPROACH IN THE STUDY OF RELIGION

The cognitive approach to religious phenomena is based on the assumption that religious phenomena are generated by lawful cognitive mechanisms. In other words, religious thinking and doing is generic human functioning and does not differ from other modes of cognition and action. If a mechanism such as Gestalt formation affects the perception of traffic signs, it also affects religious perception. If human memory constructs and distorts courses of events in the case of personal life histories, it does the same in the case of religious remembering.

The postulated cognitive mechanisms are universal, even though they account for diverse religious appearances. The cognitive approach is reductive in the traditional sense inasmuch as religious phenomena are seen to be related to more fundamental mechanisms,

such as a set of cross-cultural properties that account for the diversity of religious occurrences. Like the other cognitive sciences, the cognitive theory of religion works from the hypothesis that the target of explanation is rendered intelligible on the basis of its causal origins. The cognitive approach also provides a solution to the perennial problem of relativism. Diverse and apparently conflicting beliefs and values share a common denominator, namely their cognitive origins. For example, beliefs about technology and beliefs about evil spirits can be compared on the basis of their cognitive functions.

In addition to cognitive roots, religious phenomena have cognitive contents, i.e., they are used to grasp the world, to understand our situatedness in the world, and to understand and explain events. Thus, religion is a cognitive entity in two senses: first, religious experiences and rituals are generated by multipurpose cognitive processes; and second, religious experiences and rituals have cognitive contents, which is to say that they have semantic roles in the overall information processing of human beings.

The cognitive theory of religion has concentrated either on the cognitive mechanisms used to produce religious phenomena (Boyer 1994; Lawson and McCauley 1990), or on the cognitive content of religion (Horton 1982). These two trends also can be found in other cognitive sciences, and they may be referred to as the neuropsychological approach and the cultural approach, respectively. The neuropsychological approach cultivates the reductive side of the cognitive approach, looking for explanatory mechanisms at the level of neural and psychological mechanisms. In contrast, the cultural approach assumes that there is a level of lawful mechanisms above the psychological and the neural. This is the level of cultural and religious entities.

Both approaches are reductive in the generic sense that they try to reduce multiple religious phenomena to a set of generalities. The neuropsychological approach makes the further claim that explanatory mechanisms exist at the level of multipurpose cognitive mechanisms, whereas the cultural approach asserts that the universal level more closely approximates the phenomena themselves. This cultural approach addresses the essence of phenomenology; the aim of the phenomenology of religion is to identify the set of lawful mechanisms that exist "near the surface," a point to which we will return later.

In both approaches, reduction occurs in a variety of ways. An important distinction should be made between epistemological and ontological reduction (cf. Karlsson and Kamppinen 1995). Epistemological reduction involves the claim that religion can be understood by means of relating it to a set of explanatory mechanisms. Ontological reduction holds that instead of religion, what actually exists in the world are only explanatory mechanisms. The higher-level structures will prove to be partly illusory, as the real, lower-level mechanisms will be identified in the course of research. Ontological reductionism has lost its support during the past decades, and now, the interesting questions of reduction are mostly epistemological in nature. What is the best explanation of religion? What kinds of mechanisms have explanatory force in the case of religion? What kinds of explanations are optimal in the sense that they will solve more problems than they create?

Both approaches are needed in the cognitive theory of religion. However, it would be unfortunate were the cognitive theory of religion to follow the course of other cognitive sciences, in which the cultural approach tends to be overshadowed by the neuropsychological approach, leading to the eventual separation of the cognitive and the cultural. This would be a loss both for cognitive science and also for the study of religion. The reason for the dominance of the neuropsychological model resides in the differences between the research tools and the experimental settings of the two general approaches. The neuropsychological approach boasts of science methodology, while the cultural approach suffers from the lack of systematic explanatory tools.

THE MULTIPLE SENSES OF PHENOMENOLOGY

The phenomenological method itself has been much debated. Is it a magical trick by means of which we can distill the essence of mental phenomena and their constituent concepts? A useful distinction has been proposed by Daniel Dennett (1982): autophenomenology is directed towards one's own mental events, and heterophenomenology is directed towards other people's minds. In the spirit of Gilbert Ryle, Dennett claims that they are on the same mission, and indeed, heterophenomenological research yields much more reliable evidence than autophenomenology. Another contemporary writer on this topic is John Searle, who gives good phenomenological

analysis of mental acts in his book *Intentionality* (1984). The act of perception, for example, has its conditions of satisfaction; it also is accompanied by a feeling or a representation that it has been caused by the perceived thing.

At least two different senses of phenomenology have been used in the study of religion   phenomenology as a taxonomic description of religious phenomena; and phenomenology as a systematic study of religious experience. The first brand of phenomenology refers to the taxonomic activity carried out in all fields of the study of religion, and the practice of phenomenology in this sense refers to the classification and organization of religious phenomena. Categories such as ritual, prayer, shaman, or polytheism are phenomenological categories; these are the ways in which religious phenomena appear in the world, at least according to traditional classification. Indeed, a taxonomy of things to be studied is a necessary condition for conducting a rational study of religion in the first place, and thus this sense of phenomenology is not optional (Jensen 1993). All branches of scientific inquiry require that their taxonomies are in order (Bunge 1967).

It is characteristic of the study of religion, however, that even this basic phenomenology is disputed. Much of the debate and uncertainty is due to the fact that many of the categories used are culturally specific. The notion of "God," or the category of the supernatural, for that matter, are products of Christianity and Western civilization at large. For this reason, problems in mapping out taxonomies would benefit from the links between traditional categories and truly cross-cultural cognitive descriptions.

The second branch of phenomenology addresses religious phenomena as they appear to the inquiring mind. This style of phenomenology assumes that the cognitive mechanism imposes a certain structure upon the world, and the study of these structures reveals what the cognized world is like. Phenomenologists such as Gerardus van der Leeuw and Rudolf Otto both tried to distill the mental structures through which religious phenomena are known to us. Both utilized the notions of *power* and *otherness* as central, structuring concepts. Thus they employed what they felt were intuitive, cross-culturally valid notions. Later, it has become evident that both were strongly affected by their respective religious backgrounds.

BRENTANO AND HUSSERL: THE HARD CORE OF PHENOMENOLOGY

Here, I focus on the contributions of Husserlian phenomenology to the study of religion, and although the work of William James also would be exemplary, it is quite another story (Ryba 1991). Edmund Husserl's phenomenology is based on Franz Brentano's descriptive psychology (Sajama and Kamppinen 1987). Brentano was Husserl's teacher, and although Husserl invented a new vocabulary for his phenomenology, it has been claimed that the hard core of his thinking remained Brentanian (Smith 1994). From Brentano's theory, Husserl adopts at least three features: the idea of descriptive psychology; the thesis of intentionality; and the theory of wholes and parts, all which are relevant for the cognitive theory of religion.

In Brentano's theory, descriptive psychology is distinguished from genetic psychology. Descriptive psychology describes mental phenomena, characterizing their general properties and the necessary connections that exist between different mental phenomena. The description of mental events requires that we step back from the usual objects of our mental acts and instead turn our attention to the mental acts themselves. In Husserl's theory, this descriptive approach is called "phenomenological description," which is distinguished from the natural attitude of day-to-day life in which we conceive of the world as it appears to us.

What we learn from descriptive psychology is that there is a level of capturing the cognitive phenomena in which the causal connections are not relevant. A cognitive state, such as hoping for the Second Coming, has two constituents: the content concerning the Second Coming, and the psychological mode of hope. The belief that Jesus is the Son of God, again, has a propositional content that Jesus is the Son of God, and the psychological mode of belief. Brentano distinguished three basic psychological modes out of which all mental phenomena may be constructed: presentations (*Vorstellung*); judgments (*Urteil*); and emotions (*Gemütsbewegung*). In his introduction to *Deskriptive Psychologie* Brentano (1982) outlines his task as to show: "the ultimate mental constituents out of whose combinations all mental phenomena are built up, just as all words are built out of letters. Its realisation could serve as a foundation for a characteristica universalis, such as it was projected by Leibniz

and before him by Descartes" (Brentano 1982, x). Other, more complex modes could be analyzed by means of these three basic modes. The case of fearing that one will spend eternity in hell, for example, is made up of the following ingredients: a presentation of oneself in hell; a judgment to the effect that it is possible that one will spend eternity in hell; and a negative emotional response to this possibility.

Intentionality, according to Brentano, was the essential characteristic of all mental events. Mental happenings such as perceptions, beliefs, fears, and hopes, all share one feature: they are intentional, or bear a connection to an object. Intentional nexus is something that characterizes mental events only; it glues the mind and the world together (Grossmann 1984). While Brentano holds that intentionality binds mental acts to their objects, Husserl adds a third term to this relationship: the meaning, or *noema*, by means of which the actual psychological event directs itself to the object. Thus opens a new area of research the world of meanings. Husserl emphasized the peculiar characteristics of meanings on several occasions, especially in his work *Ideen* (Husserl 1913). According to Husserl, when we perceive a tree, there is the actual act of perception, the real tree, and the tree as perceived, which is the *noema*. The ideal tree (the meaning through which we perceive) cannot be burned down, since it belongs to the ideal world of meanings. The *noema* is a kind of type of meaning, and it can be appropriated by many perceivers. The actual tokens of meaning realized in particular minds are called *noesis*.

Husserl's system of understanding *noema* the meaning by which the actual psychological event directs itself to the object is fruitful in the cognitive ethnography of religion, in which we study the collective and individual traditions of human groups, together with the variation of meaning systems at the level of individual interpretations. The framework is especially good for studying meaning systems as independent entities that struggle for existence, time, and space in human brains. To put it simply, Husserl argues that the meaning systems utilized in cognitive processes have a type/token structure, by which they exist both as ideal types and as particular realizations. In the theory of religion, the parallel distinction is drawn between the collective and individual traditions. The types of meaning systems emerge from the researcher informant interactions.

Husserl proposes two other concepts that are useful in cognitive research: adumbration and horizon. Both concepts pertain to the constructive nature of cognitive activities: how the meaningful world is composed of imperfect materials. Adumbration means that the objects of perceptions and imagination appear as one-sided adumbrations (*Abschattungen*). They are never present in their totality, but they exist instead as imperfect objects. For example, when I see a building, I see only its facade, and there is no possibility of seeing it all at once. Also, when I listen to the music, I hear adumbrations (pieces) of the composition, not the whole melody at one time. One of my informants in the Amazon, when descibing a *maligno*, an evil spirit, said that when it appeared to him, it had horns and evil eyes, thus showing only one side of itself.

Objects appearing in adumbrations are what Alexius von Meinong, also a student of Brentano's, calls *incomplete objects* (Meinong 1915). Incomplete objects are indeterminate with respect to their properties. A *maligno*, for example, cannot be said to have feet, or not to have feet, but it is indeterminate with respect to the property of "feetness." The character of Jesus encountered in a mystical experience is not blue-eyed nor brown-eyed. He is indeterminate with respect to this property. Complete objects belong to the real outside world, and they are determinate with respect to all properties: they either have them or do not have them. Another related distinction introduced by Meinong is between *auxiliary* and *ultimate* objects. Auxiliary objects are the ones through which we cognize ultimate objects. For example, when perceiving a house, the meaning inherent in the act is the auxiliary object and the house itself is the ultimate object. Auxiliary objects are, by necessity, incomplete objects, whereas ultimate objects can be either incomplete or complete.

Horizon refers to the systems of meaning that surround particular mental acts. In apprehending a *maligno*, for example, the informant expects that it does something, such as speaks or moves. In perceiving a house, we expect that the facade also is connected to the rest of the house. The horizon involves the possibilities that stem from a particular experience. An entity located in space and time, such as an evil spirit, is expected to be able to move and to occupy other regions of space and time. A promise, as another example, has connections to its past preconditions as well as future realizations.

COMMONSENSE ONTOLOGY AND REASONING IN TERMS OF WHOLES AND PARTS

For Brentano and Husserl, the idea of wholes and parts is of special importance. Both are interested in determining the abstract characteristics of mental events, or how the structure of cognition affects the way in which we conceive of the world. Both also are interested in the ways of the world itself. In the Austrian philosophical tradition, phenomenological generalizations often are transferred into the ontological realm. In this sense, the modern cognitive study of religion can profit from Husserlian phenomenology, since one of the leading questions in cognitive science is how cognitive mechanisms affect the ways in which the world appears to us.

It also is fruitful to consider the status of so-called commonsense ontology, namely whether or not there exists a set of cross-cultural ontological principles by means of which reality is conceived. According to commonsense ontology, the world is made of physical things, persons, and their relations. Moreover, extended things occupy spatial and temporal locations, and they can affect each other through causal connections. Religious ideas are especially dependent on commonsense ontology, since, as Boyer (1994) argues, their hallmark is that they violate some aspect of commonsense ontology.

In his *Logische Untersuchungen*, Husserl (1900 1901) proposes a detailed interpretation of commonsense ontology: the theory of wholes and parts. According to this idea, the cognized world is composed of spatial, temporal, and conceptual part whole structures. The theory of wholes and parts is based on Aristotelian and Brentanian views of substance and accidents. For Brentano, who is trying to provide a coherent interpretation of Aristotle's ontology, a substance serves two purposes: it is a bearer of accidents and also their individuator. A substance is something that can gain or lose accidents (Smith 1994). For example, a praying person is a combination of a substance (the person) and an accident (the act of praying). The praying does not exist without its bearer, whereas the person can go on existing even though he or she is not constantly praying. After losing the accident "praying," the person may gain another accident such as sleeping or eating. The substance helps to individuate the act of praying and it is possible to distinguish between this prayer and some other person's prayer on the basis of their bearers.

Accidents are manifold. In Aristotle's system, a substance can support accidents such as quality, quantity, relation, spatial and temporal location, situation, having, action, and passion.

In Husserl's construal, objects are seen as wholes composed of parts, substances, and accidents. A religious group, for example, is composed of individual persons and institutional accidents such as roles, rules, power relations, and supernatural entities. The Christian God is a part whole structure with three components, the God, the Holy Ghost, and the Son of God. Objects in the world of meanings are thus composed in certain lawful ways. Their constituents bear systematic relationships to each other, and complex objects can be included as constituents in larger wholes. An important relation is *inseparability*, or dependence. Complex objects differ from each other in that their accidents bear different relations of dependence to other accidents and to the substance.

INSEPARABILITY AND THE AMAZON

Barry Smith (1994; see also Smith and Mulligan 1982) has formulated the principles of inseparability as follows:

a is separable from *b* = *a* is such that it can continue to exist even though *b* should cease to exist.

a and *b* are mutually separable = *a* is separable from *b* and *b* is separable from *a*.

a is inseparable from *b* = *a* is such that it can continue to exist only if *b* also continues to exist.

a is one-sidedly separable from *b* = *a* is separable from *b* and *b* is inseparable from *a*.

a is mutually inseparable from *b* = *a* is inseparable from *b* and *b* is inseparable from *a*.

In what follows I illustrate the principles of separability in light of empirical material collected from the Peruvian Amazon (Kamppinen 1989). During my fieldwork on ethnomedicine, I focused on the ethnopsychological models pertaining to health and illness, that is, the ways in which informants conceptualized the human person as a whole, composed of different parts.

According to my informants, the human person is composed of body and multiple souls. I first encountered the notion of multiple souls in the Amazon when investigating an illness category called *manchari*, or *susto*. *Manchari* is a children's illness; it causes insomnia,

diarrhea, and other problems. It is best treated by means of traditional medicine: a local healer, *curandero*, blows tobacco smoke on the patient and chants magic songs. What happens in *manchari* is that a child loses his or her soul. The healer, if successful, will get the soul back and return it to the body. The soul can be lost because of fright, or because a vagabond spirit hits the child. In the latter case, the cause (and sometimes the illness) is called *mal de aire*, the evil wind. I asked my informants how a child survives during the soul loss. The answer was that there are multiple souls. One soul (*alma*) is responsible for keeping the body alive, whereas another soul (*espiritu*) is the Aristotelian rational soul, the one in charge of consciousness. In *manchari*, the rational soul is lost while the bodily soul remains. In the case of death, the bodily soul leaves the person as well.

The application of phenomenological tools concerning part whole structures to the aforementioned example yields a number of claims. First, the rational soul is a separable part of the person: it can wander off and lead an independent life, so to speak. These wandering souls operate especially in shamanistic trances, when *curanderos* send their own souls to explore the world of the spirits. Second, the bodily soul is an inseparable part of the person. Once the bodily soul leaves, the person ceases to exist as a physical being. An interesting piece of variation in tradition also emerged. One of my informants explained that the rational soul is the only soul a person has. During the *manchari*, it escapes the body but remains close to it, thus affecting the person and keeping the body alive via sort of a remote control. In this case, the human person was conceptualized as being composed of the body and the soul, but the soul could occupy a region of space outside the body's boundaries. The soul could not stay in just any place, but it was bound to occupy a region within ten meters or so from the body. The connection between the body and the soul is relevant during the wake as well. The dead person attracts his or her own soul for a few days after the death, and the soul visits the places where the body is. During the wake, the dead person is still sort of composed of his body and the soul, but the tie is weakening during the wake, and it is finally cut after the wake.

In addition to *manchari*, other ethnic illnesses in the Peruvian Amazon involve interesting part whole ideas. In case of *brujeria*, or witchcraft, the victim usually is occupied by an intruder. This may

be a projectile or an evil spirit shot by a witch. Both concrete projectiles, like spines or worms, and spirits occupy a region of space when inside the person. The projectiles are in specific places, whereas the spirits pervade the whole body. Both are separable parts, but their spatial ways of being are different. An interesting feature emerged when I asked about the separability of projectiles. A concrete projectile can be shot towards an arm, leg, the chest or head, and hence it is presumably *there*. I inquired why, since it is there, it cannot be extracted by means of Western medicine, which specialised in cutting things up? The answer was that these projectiles are not visible to Western doctors, who are not familiar with the relevant magic songs. Thus, a projectile appears to be such a part of the human person that can be extracted only when the larger whole involves the correct magic song. The separability of a projectile was thus inseparable from the magic song.

Reasoning in terms of wholes and parts also helps us understand Amazonian concepts of health and illness. The state of health is defined as a state of balance, and illness is a state of imbalance. In most illnesses, there is either too much or too little of something in the body. These ingredients of health and illness are conceived as impermanent parts of the human person, and their manipulation is the task of the healer. This not only refers to concrete, extended parts such as liquids, organs, and projectiles, but it also refers to abstract parts such as states of mind, intruding spirits, and processes such as getting older and weaker.

The human person and the related fields of knowledge such as ethnopsychology and ethnomedicine are obvious targets when looking for reasoning in terms of wholes and parts. Another field is ethnosociology, or how the community is conceptualized. Among the Amazonian Mestizos, especially revealing are the happenings at All Saints' Day (*el dia de los muertos*). During these days, the dead, who are offered alcohol, tobacco, and bread, arrive to visit the living. After the offerings, they are blessed with the intention that they will stay away for a year. The boundaries of the social whole are thus ritually guarded and opened during All Saints' Day, when temporary parts are admitted to enter. Most troublesome are so-called restless spirits, who are not resting in peace, but are in a middle state between the living and the dead.

CONCLUSIONS

To improve the cultural cognitive theory of religion, we need better phenomenological tools. Phenomenological tools remain close to the surface of the phenomena themselves, and they are sensitive to the structure of experiences. Is part whole analysis up to this task? In what sense can it grasp the cultural nature of religious things?

First of all we need to clarify what is meant by "cognitive" and "cultural." With respect to cognitive phenomena, the paradigmatic objects of research for the study of religion are propositional attitudes, or mental acts: beliefs, desires, fears, hopes, perceptions, and so on. This layer of cognitive phenomena is at the same time cultural, since the contents of these acts are public, in the sense that they can be communicated verbally, and the means of expression are shared. Thus, the core area of religious belief and ritual is both cognitive and cultural.

Still, cognitive phenomena that are noncultural, human mechanisms do exist. A good example is the mechanism of visual perception. The mechanism itself is biological, but the contents are cognitive and cultural. Are there religiously relevant phenomena that are cognitive but not cultural? If we understand "cognitive" as pertaining to content processing, then there are no cognitive phenomena without cultural meaning systems. If, on the contrary, we look at the mechanisms subserving the processing of meanings, then we have the cognitive without the cultural.

The cultural analysis of religion has come to mean that cultural materials are analyzed in the sense that their formal properties are looked for and systematized. The end result is usually a set of rules or models that are assumed to operate behind the material. What makes the analysis "cultural" is the assumption that these models are not linked to the biological mechanism in such a way that studying biology would help us understand the model and their properties. How does the part whole analysis fit into this picture? Part whole relations obtain in the world of meaning systems through which the religious worlds are cognized. They are real features of cognition, but it is not plausible that all of their interesting properties may be explained in terms of biology. It is true, though, that part whole thinking has biological foundations: all thinking has, and this specific feature of cognition probably was born in the interactions between humans and other extended, material containers populating the

world as we know it (Johnson 1988). Since this holds for all features of cognition, no explanatory surplus value is gained by means of relating part–whole features to biological foundations. Explanatory strategies should be assessed in terms of their problem-solving power.

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CHAPTER 9

Why a proper science of mind implies the transcendence of nature

Francisco J. Varela

The main intuition that animates this chapter (a substantially modified version of Varela 1997 and 1998) is that the natural roots of mind are permeated by the depth inherent in direct, lived experience. I will develop this intuition in two steps. First, the very thrust of a proper scientific analysis of mind, i.e., in the context of the cognitive sciences, leads to the need for a detailed examination of *experience* itself. Second, examined experience and scientific analysis can have an explicit, non-dual relationship, i.e., a *mutual determination*, that avoids the extremes of both neuro-reductionism and ineffability.

My contribution to this volume is to focus on the significance of human experience *per se*, and only by implication to consider that particular domain of human experience we call "religious." This can be rephrased in a more constructive sense: rather than being concerned with religious experience conceived in its most obvious theological context, I am more interested in the larger domain of a (Jamesian) sense of religion as the quest for meaning and values in life. Hereafter, I will describe this simply as "spiritual experience," and I will subsume religious experience under it. This distinction is indispensable if one is to take into account a number of non-theistic traditions such as Buddhism, Taoism, gnosticism, etc., for which the common ground is, precisely, a disciplined and transformative examination of human experience.

Commonly in spiritual traditions, human experience is not taken at face value, but it is *examined* in one way or another. In contrast, cognitive science has been almost entirely interested in cognitive faculties in ordinary, *un*examined life. But this is beginning to change rapidly, and it is not surprising, since within its field and scope, cognitive science faces the unique challenge of containing our own conscious life, and, *a fortiori*, the very act of examining our individual life. I have argued elsewhere for the importance of developing such

an experiential neuroscience, or *neurophenomenology* (Varela 1996). Such a research program is crucial if we are to avoid simply reducing experience (examined and unexamined) to neural accounts; instead, a proper methodology is required for its examination (Varela and Shear 1999). Here, then, the interface with spiritual traditions naturally presents itself.

Related to the issue of methodology, there is the complementary question concerning the nature of the relationship between such external, scientific accounts deriving from cognitive science and first-person, i.e., phenomenological, accounts directly anchored in lived experience. How do these two domains of observation and description mutually constrain, or codetermine, one another?

Finally, this proposed research cannot be accomplished in an abstract, general way. Instead, I couch my ideas in an explicit methodological context: Husserlian-inspired as the light of modern cognitive science. Further, in order to make the whole directly tangible, I will focus on a concrete study of the central question of the (neuro)phenomenology of the experience of time, the ever present embodied now (Varela 1999c).

THE NATURALIZATION OF PHENOMENOLOGY

Murmurs in the cathedral

Before embarking upon the main topic, however, I need to sketch briefly the neurophenomenology in the background of the modern science of mind. Advocates of this new science would agree that many themes are wide open, and at least some of them are, at present, in massive turmoil. Chief among them is the problem of the relation of cognitive science to phenomenological evidence, sketched above, most especially of the kind gathered since Husserl and his direct successors.

Within the contemporary Anglo-Saxon philosophy of cognitive science, this problematic link became popular with T. Nagel's famous article (1970, 394–403), which was followed by a boom of studies on *qualia*, consciousness, and experience. Over the last decade, the topic has received a more articulate formulation, together with a more systematic treatment, in a series of book-long analyses devoted to consciousness, e.g., Jackendoff (1987); Dennett (1991); Baars (1997). For a recent collection of today's "conscious-

ness" studies, see Hameroff *et al.* (1996). In fact, this new movement seems to have worked into two opposing directions. On the one hand, it has elicited new efforts, especially on the part of neuroscientists, to show that cognitive science indeed can account for phenomenological data. On the other hand, it has nourished a more or less radical criticism of the general picture of the cognitive mind that emerged out of the cognitive revolution (see Roy *et al.* 1999).

I now need to survey the main *solutions* actually advanced by cognitive scientists over the last fifty years, which give substance to this discipline. It seems useful to distinguish at least three major approaches: (1) computationalist-symbolic; (2) connectionist-dynamic; and (3) embodied-enactive (Varela 1995). These trends all have been present from the inception of cognitive science, but their dominant or preeminent role has changed from the exclusive dominance of the computationalist view to a co-existence of these three in contemporary research.

As has been often stated, the fertile postulate of the symbolic-computationalist view, which gave it its visibility, is that cognitive processes are of the kind involved in a general theory of computation derived from the early work of Turing and von Neumann. The mind *literally* is information processing in the sense of logic-like rule manipulation of discrete symbols. In this radical form, it gives rise to a functionalism in which biological implementation is entirely irrelevant: it is the software, not the hardware, that matters for the mind (Fodor 1983).

In the late 1970s, connectionism introduced a novelty by changing the nature of the cognitive machinery from a system of rules that manipulate symbols, to one of networks that give rise to typical and regular dynamical behavior that can be interpreted as rules at higher levels of description. The traditional computationalist orthodoxy thus was challenged by calling into question the discrete nature of symbols and the pertinence of rule-manipulation as the appropriate level to focus research. Instead, connectionism posited the search for mechanisms formulated in the language of an entirely different formal discipline, that of nonlinear dynamical systems (Port and van Gelder 1995). In this sense, connectionism ceased to be "information processing" in a restricted sense. Furthermore, it introduced within cognitive science a radically new and important idea: the *emergence* of high-level structures or entities from the interaction of lower-level terms. The notion of emergence, which is

intrinsic to a dynamical formulation, has received renewed attention from the so-called sciences of complexity, which derive from early ideas on self-organization in the 1950s.

Connectionism, however, left unquestioned the relationship between cognitive processes and their role in cognitive behavior. For both computationalism and connectionism (in its dominant form), this relation is that of a strict *representation*: internal entities stand for, or correspond to, world properties and events, and it is this semantic-like correspondence that gives internal processes their behavioral efficacy. The embodied-enactive view shares with connectionism the importance of dynamical mechanisms and emergence, but it questions the relevance of strict representations. Cognition is seen as the emergent (or enactive) activity of situated agents who create regular interdependencies with their surroundings and thus do not depend upon semantic-like correspondence with their surroundings. As was the case for connectionism, these ideas have their roots in the early days of cognitive science (such as J. J. Gibson's work), but they have been taken up with vigor in the last five years in various areas such as robotics and artificial intelligence, neuroscience, and linguistics, generating lively philosophical debates in these fields (see Varela *et al.* 1996 [1991]; Clark 1997). This trend towards an enactive cognition is an important underpinning of my discussion here.

In these three basic approaches to cognition, and in various possible mixtures thereof, cognitive science can lay claim that the traditional philosophical mind body problem has become a scientific one that henceforth must be *solved* scientifically: the link is provided precisely by the processes that give rise to the mental, however one prefers to couch them. However, the mental is something of which we also have an immediate experience. The terms "consciousness," "awareness," and "first-person account" all have been used to designate such an experience. As mentioned before, for many active partisans of cognitive science, there can be no satisfactory science of cognition that does not tackle this experiential dimension. As Flanagan says, "The irony is that the return of the mind to psychology attending the demise of behaviorism and the rise of cognitivism did not mark the return of consciousness to the science of mind. Mind without consciousness. How is that possible?" (1992, 3).

These are the murmurs in the cathedral the contemporary scientific knowledge relating to the mind.

The centrality of phenomena

By itself, experience (or any other associated term) does not carry any Husserlian, or strictly phenomenological, connotation. But the necessity for such a phenomenology has been felt and explicitly acknowledged by a growing number of the people concerned with the explanatory gap evoked above. But narrowing the distance separating the subjective and the objective is evidently also a way of narrowing the gap between the mental and the physical. Nagel remarks: "Apart from its own interest, a phenomenology that is in this sense objective may permit questions about the physical basis of experience to assume a more intelligible form. Aspects of subjective experience that admitted this kind of objective description might be better candidates for objective explanations of a more familiar sort" (1970, 402). This further specification sheds light on an additional feature of the sort of phenomenology needed to close the gap — it should be a naturalistic one in the minimal sense of not being committed to a strictly dualistic ontology. In other words, it should be open to explanatory accounts, and the explanations invoked should make clear how phenomenological data also can link productively to accounts of brain and body — how they can be possessed by such natural entities without the recourse to an ontological leap in midcourse.

It is clear that this naturalistic feature traditionally has not been attached to phenomenology. Further, one of the most salient features of phenomenology is its divergence from natural sciences, since essences concern pure experience, and phenomenology's descriptive stance differs from the axiomatic approach to natural objects. In fact, the whole point of Husserl's enterprise is to claim that there is a dimension of the mental that escapes the natural sciences and requires a specific, rigorous investigation of a different kind than natural science.

Thus, it is essential to be precise about what such a naturalization could be, since it appears, prima facie, as a phenomenological oxymoron. As one may suspect, there may be a number of distinct possibilities, all of which start from the same explanatory gap, but each of which chooses a substantially different approach in its attempt to bridge it. One thing is clear, however — we are not seeking in any way a naturalization project that would absorb the phenomenological basis into a "merely" naturalized account. This

would be as futile as another turn of the circle that created Husserlian anti-naturalism in the first place. Instead, we seek to produce epistemological and ontological shifts whereby the two domains of natural objects and phenomenological descriptions can provide a three-dimensional view of mind and experience together. According to this perspective, any dualist extreme, whether reductionist/objectivist, or transcendentalist/mentalist, is a declaration of failure. Moving beyond these antinomies is precisely what is at stake here if we are to avoid yet another repetition of the compulsive history of pendulum swings between nature or a *Geistiges* (something between the spiritual and mental, from the German *Geist*) domain.

Specifically, the kind of naturalization we seek will not be found in "merely" designating the neurobiological (brain or bodily) correlates of consciousness, since this would leave in the shadow the precise circulation between them. In other words, what needs to be addressed is the fact that human experience encompasses properties of both the material and the mental without contradiction. Thus, the question is not so much how to naturalize Husserlian phenomenology, but, rather, what should a natural science (such as cognitive science) become to be fully adequate to phenomenological descriptions that could be naturalized but not epistemically reduced?

Here, I use a very specific example of phenomenological data as a springboard to motivate my discussion below. This is taken from my aforementioned broader study of temporality. Though its complete scope will be left in the background, I will only draw out here those aspects relative to immediate retention.

A NEUROPHENOMENOLOGY OF JUST-PAST

Phenomenological data pertaining to retention

As is well known in Husserl's analysis (Husserl 1966), "nowness" does not correspond to a point but rather to a location with a *center and periphery* structuring, as in the visual field, so that Husserl speaks of nowness as a "temporal fringe." In other words, the very mode of appearance of nowness is in the form of extension, and to speak of a now-point obscures this fact. Husserl writes, "present here signifies no mere now-point but an extended objectivity which modified phenomenally has its now its before and after" (1966, 201).

A key issue in this examination of temporality is the contrast

between the mode of appearance of now, and the mode of appearance of the just-past, i.e., the act which reaches beyond the now. As Husserl points out, commenting on similar reasoning in Brentano, "We could not speak of a temporal succession of tones if . . . what is earlier would have vanished without a trace and only what is momentarily sensed would be given to our apprehension" (Husserl 1966, 397).

But how can this structure of time perception be constituted? What is preserved is also modified. The relation of now to just-past is one of slipping into a new mode of appearing; but very strong principles emerge in this transition: "new presentations each of which reproduces the contents of those preceding attach themselves to the perceptual presentation and in so doing *append* [my italics] the continuous moment of the past" (Husserl 1966, 171). This phrase suggests the *dynamics intrinsic to these slippages of appearance.* It is a key point for the bridges between naturalization and the texture of temporal experience, as we will see presently.

What form does it take, this slippage from nowness to immediate past? For the sake of making the discussion less abstract, let me consider briefly the examination of a specific temporal event: listening to the sound of a glass struck by metal. (These observations are derived from the seminar *Psychologie et Phénoménologie*, in Paris.) In this specific experience, the sound has a texture in itself: a sudden clank followed by a high tone that rises, dwells for a brief time, and is subdued progressively, until it disappears as sound. This entire episode lasts a few seconds.

Several phases can be described within this episode. Phase I, the immediate clank, marks the beginning of nowness according to the explicit set-up of the exercise. It requires no activity on the part of the ego-self: in this phase, sound holds itself by itself. Phase II ensues without discontinuity in sound, but with a sharp discontinuity in the conscious act that goes with it. In fact, there is a sharp appearance of holding that involves an ego-self center, which could be described as a selective or focal attention. This activity is essential to hold the sound as such, otherwise it is submerged rapidly by the rest of the contents of the auditory field (street noise, words, etc.), and beyond that, by the rest of the experiential field. It is the phase of "I hold it." It is present and is remembered in a "primary fashion" (Husserl 1966, 132).

Phase III follows Phase II less abruptly, and is characterized by an

increase in intensity on the part of the subject, an activity of going towards the sound and bringing it back to a still-present remembrance. It is a phase of "I hold it tight (*Ich halte ihn fest*)." However, the sound is still vivid, although slightly veiled with respect to Phases I II. The description of the slippages of the just-past is complete in these three phases. A further Phase IV arises following a longer lapse of time, a presentification or recovery. It is distinguished simply since the quality of the sound is entirely veiled, and it acquires the semantic tonality of the descriptive effort that accompanies the "I can remember it" phase. Notice that only a relative coincidence exists between the amplitude of sound and the Phases I IV:

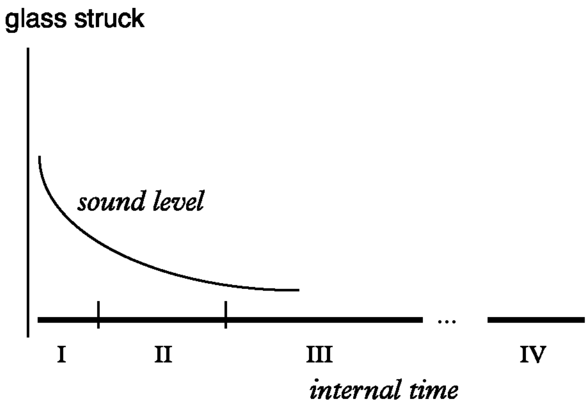

Figure 2

Where shall one draw the distinction between present, retention phases, and presentification? The granularity of Husserl's analysis is somewhat incomplete, and I am led to the following interpretation. Phase I should be called a "pure present," a new distinction that is needed here. Phase II is the beginning of retention, and the better description is a remanence, another intermediate category that is required by the data. Phase III is Husserlian retention proper, which shifts into Phase IV, bona fide presentification. This provides a four-part structure for the experience of present-past, or living present, instead of the classical twofold present-retention.

The neurodynamics of slippage

In order to continue to naturalize phenomenological data, we now need to examine the organic roots of such phenomenological data in order to operate at the right level of organismic description. This, again, requires a modicum of context.

My overall approach to cognition, as indicated above, is based on situated, embodied agents. I have introduced the term *enactive* (Varela *et al.* 1996 [1991]; Varela 1997) to designate more precisely this approach, which comports two complementary aspects: (1) the ongoing coupling of the cognitive agent, a permanent coupling that is fundamentally mediated by sensorimotor activities; and (2) the autonomous activities of the agent whose identity is based on emerging, endogenous configurations (or self-organizing patterns) of neuronal activity.

Enaction implies that sensorimotor coupling modulates (but does not determine) an ongoing endogenous activity that it configures into meaningful world items in an unceasing flow. I cannot expand this overall framework more extensively, but it is the background of my discussion of temporality as a neurocognitive process. Enaction is naturally framed in the tools derived from dynamical systems, in stark contrast to the cognitivist tradition that finds its natural expression in syntactic information-processing models. From an enactive viewpoint, any mental act is characterized by a concurrent participation of several functionally distinct and topographically distributed regions of the brain and their sensorimotor embodiment. It is the complex task of relating and integrating these different components that is the root of temporality as seen from the perspective of the neuroscientist. A central idea pursued here is that these various components require a *frame or window of simultaneity that underlies the center/periphery constitution of the lived present.* According to this view, the constant stream of sensory activation and motor consequence is incorporated onto an endogenous dynamics framework that gives it its depth or incompressibility.

This idea is not merely a theoretical abstraction: it is essential to the understanding of a vast array of evidence and experimental predictions (see Varela *et al.* 1981; Dennett and Kinsbourne 1991; Pöppel and Schill 1995). These endogenously constituted integrative frameworks account for perceived time as discretized and nonlinear, since the nature of this discreteness is a horizon of integration rather

than temporal "clouds." In fact, it is useful at this point to introduce three scales of duration to understand the temporal horizon as just described: (1) basic or elementary events (the '1/10' scale); (2) relaxation time for large-scale integration (the '1' scale); and (3) descriptive-narrative assessments (the '10' scale). This recursive structuring of temporal scales is a unified whole; not only does it make sense for object-events, but in general, it describes how something that is temporally extended can show up as present and reach far into a temporal horizon.

The first level is already apparent in the so-called "fusion interval" of various sensory systems: the minimum distance needed for two stimuli to be perceived as non-simultaneous, a threshold that varies with each sensory modality. These elementary events can be grounded today in the intrinsic, cellular rhythms of neuronal discharges, and in the temporal summation capacities of synaptic integration.

The second scale is the one that interests us here. It corresponds to that of long-range integration of *neuronal ensembles* (henceforth NA) (Varela 1995). An NA is a distributed subset of neurons with strong reciprocal connections. Here, we recover the importance of dynamical network properties in which sequentiality is replaced by reciprocal determination and relaxation time. In the language of the dynamicist, the NA must have a relaxation time followed by a bifurcation or phase transition, that is, a time of emergence within which it arises, flourishes, and subsides, only to begin another cycle. This holding time is bounded by two simultaneous constraints: (1) it must be longer than the time of elementary events (the 1/10 scale); and (2) it must be comparable to the time it takes for a cognitive act to be completed, of the order of a few seconds, the 1-scale. In brief, as we mentioned above, the relevant brain processes for ongoing cognitive activity are not only distributed in space, but they also are distributed in an expanse of time that cannot be compressed beyond a certain fraction of a second, the duration of integration of elementary events.

Retention as dynamical trajectories

The aforementioned observations are important because they lead us directly to an explicit view of the particular kinds of self-organization underlying the emergence of neural assemblies. These

dynamical processes, in turn, illuminate the emergence of temporality and its structure. In the kinds of emergent processes involved above, there exists a natural account of the apparent discrepancy between what emerges and the presence of the past. Indeed, the fact that an assembly of coupled oscillators attains a transient synchrony and that it takes a certain time to do so is the explicit correlate of the origin of nowness. The synchronization is dynamically *unstable*, and thus it will constantly give rise to new assemblies in succession; we may refer to these continuous jumps as the *trajectory* of the system. Each emergence bifurcates from the previous ones its initial and boundary conditions. This means that the preceding emergence is *still* present in the succeeding one.

Such dynamical systems can be described on the basis of order parameters, which comprise two main categories: (1) the current state of the oscillators and their coupling, or *initial* conditions; and (2) the boundary conditions that shape the action at the *global* level: the contextual setting of the task performed, and the independent modulations arising from the contextual setting in which the action occurs, i.e., new stimuli or endogenous changes in motivation.

The kind of specific dynamics we have brought to bear on the understanding of retention and the just-past are not simple. In particular, arrays of coupled oscillators are interesting because they generally do not follow the classical notion of stability that derives from a mechanical picture of the world. Stability here means that initial and boundary conditions lead to trajectories concentrated into a small region point of phase space in which the system remains, a point attractor or a limit cycle. In contrast, the key role of phase transitions in biological systems is that instability is the base of normal functioning rather than a disturbance that needs to be avoided. The origin of multistability is due to properties that are *generic* to coupled oscillators and their phase relations, i.e. their mode of appearance is an invariant under a number of conditions and subjects reporting. This is further clarified by recent experiments performed with a view to studying the dynamics of multistability in visual perception.

Global temporal emergences as locally effective

Let us go back once more to the bodily, neural aspects of retention. Examined from the perspective introduced above, an integrated

moment of the present appears as a transient coherency-generating process of the organism. But the global nature of this emergence also can be phrased in its reciprocal sense: the large-scale integrative state that underlies a moment of nowness is capable of accessing any local neural processes. In other words, a unitary emergence is, by constitution, a *double* passage between two levels. This is a key to its role in the non-reductive naturalization we are examining here. This global to local action is constitutive because it shows up as order parameters in the dynamics and is mediated by means of the reciprocal and extensive interconnectivities in the brain and the organism itself. No extra ontological ingredients are required for this reciprocal, effective causation.

Let us examine more closely the structure of retention of sound examined above. The relaxation time in sensory discrimination starts from a primary event and is known to engender a first, early burst of stimulus-locked synchronous processes (around 70 msec). It then is followed by two successive waves at 280 msec and 350 msec of fast oscillations which, not linked to the stimulus any longer, very likely embody the specific cognitive content of sound itself (see Lachaux *et al.* 2000; Tallon-Baudry *et al.* 1996). A comparison of sound from memory requires still longer time to be accomplished. In brief, we find once more that within the retention trajectory, the bodily processes show evidence of a three-phase temporal pattern not unlike the one described above. Indeed, the temporal pattern of neural emergence follows the phenomenological analysis amazingly well.

In this sense, it is clear that the neural events accompanying any cognitive act are shaped and modified in the context of the rest of the neural events related to, say, limbic and memory activation. This is what I mean by a "neuronal interpretation" the generation of a mental-cognitive state that corresponds to the constitution of an assembly that incorporates or discards into its coherent components other concurrent neural activity generated exogenously or endogenously (Ghiel 1993, 143 167). In other words, the synchronous glue provides the reference point from which the inevitable multiplicity of concurrent potential assemblies is evaluated until a single one is transiently stabilized and expressed behaviorally. This is a form of neural hermeneutics since the neural activity is "seen" or "evaluated" from the point of view of the global emergence dominant at the time. Dynamically, this entire process takes the form of a

bifurcation from a noisy background to conform to a transiently stable, distributed structure bound by synchrony.

In the case of sound perception, the distraction from other sensory fields surely is matched by other neuronal assemblies that vie for dominance at every moment of global emergence. Clear evidence of this exists in the visual domain using figures embedded in noise (Rodriguez *et al.* 2000). Furthermore, the second and third waves of synchronous oscillations are quite variable in time and wave from repetition to repetition. This is interpreted sensibly as the ongoing selection among a multiplicity of neural ensembles providing the shifting background from which a dominant assembly emergences transiently.

It should be clear, also, that the neural events that participate in this process of synthetic interpretation are derived indistinctly from sensory coupling and from the intrinsic activity of the nervous system itself, i.e. levels of activation, memory associations, etc. It is also clear that whatever the mental state thus arrived at will, *ipso facto*, have neural consequences at the level of behavior and perception. For instance, if a visual recognition is interpreted in the context of an evasive emotional set and in conjunction with painful memory associations, it can lead to a purposeful plan for avoidance behavior complete with motor trajectories and attention shifts to certain sensory fields. This illustrates once again the key dimension of the view of mental states I am offering here: there is a level-crossing reciprocity, in that a mental state as such (i.e., as a global interdependent pattern) effectively can *act* on neural events that is, it can exert downward causation. For this to be more than a simple dualistic rehash, it is essential that the dominant interpretation itself is an emergent neural event. In this sense, neural events are the basis of interpretation for another class of non-synchronous, less coherent neural events appearing at another level.

By their very nature, then, mental states make reference both to our own experience, which requires a phenomenological account, and to our biological make-up, which requires a fully scientific account. We now have the elements to ask the central question that animates our inquiry here: how are these two accounts related to one another? What is the specific nature of their circulation?

THE STRATEGY OF NATURALIZATION AS MUTUAL CONSTRAINTS

The naturalistic door intrinsic to pure experience

Let me start by the observing that even in his fierce anti-naturalism, Husserl finds it necessary to project phenomenological description back within the natural attitude. This grounds the foundational nature of pure phenomenology to phenomenological psychology, although he is evasive regarding this move. Most remarkably, in §57 of the *Cartesian Meditations* he states, "every analysis or theory of transcendental phenomenology including the theory of transcendental phenomenology can be produced in the natural realm, when we give up the transcendental attitude" (Husserl 1960, 131). By acknowledging this active link between psychological investigation and the transcendental level (even if this latter remains, in his eyes, foundational), Husserl admits implicitly the possibility of this royal road to a more systematic naturalization. In fact, the psychological level is inextricably linked to the domain of the empirical, and *mutatis mutandis*, it appears as the central topic of the modern cognitive sciences.

In other worlds, once the constitution of natural objects is adequately thematized in the phenomenological realm, pure experiences also can be considered to belong to a psychological consciousness, and hence to an organism. In this precise sense, data rooted in lived, first-hand experiences are intrinsically open to a non-reductive naturalization. This is a central thesis that animates the neurophenomenological research project, which is only possible if the central issues of embodiment are put at the center of concern, both in cognitive science (as in the enactive approach), and also in phenomenology (as in the later work of Husserl and its continuation in Merleau-Ponty). In fact, it is in the lived body, broadly conceived, where "broadly" refers to the fact that this is not the place to deploy a host of central phenomenological distinctions touching on key terms such as *Leib*, *Leibkörper*, *corps propre*, *chair*, etc. The choice of terms is, of course, far from a technical aside (see Depraz 1997). In fact, one finds a "close relationship" between experience and its grounding, both as *Leib*, lived body, and *Körper*, biological body. It is in that region of events that we are given access both to the constitutive natural elements familiar to cognitive science, and also to the required phenomenological data. The rest of this chapter

further unfolds this implicit and necessary locus of circulation announced in the neurophenomenological approach, in which the notion of *reciprocal constraints* is the key. In general, the working hypothesis of neurophenomenology is that phenomenological accounts of the structure of experience and their counterparts in cognitive science relate to one another through *reciprocal constraints* (Varela 1996).

A typology of mutual constraints

What can the term "reciprocal constraints" possibly mean? What I am seeking stands in stark contrast to a correlative approach, which lists on one side items or processes, and on the other seeming equivalencies as phenomenological data, with the two sides separated by an unexamined "no-man's land." For example:

mirror cortical neurons	?	perception of alter ego
synchronous cell assemblies	?	temporal retention
efference copy	?	voluntary action

On the one hand, we are concerned with a process of external emergence with well-defined attributes, while the other phenomenological description stays close to our lived experience. The nature of the circulation one seeks is no less that of mutual constraints between both accounts, including the potential bridges and contradictions between them. The unresolved middle ground and the circulation between the terms is, by necessity, where the various views and approaches to mutual circulation will separate themselves.

More precisely, the specific nature of this double circulation can be spelled out as three distinct possibilities: (1) bridge locus as analytic isomorphism; (2) phenomenal isomorphism; and (3) generative passages. First, regarding bridge locus as analytic isomorphism, a number of authors have taken very specific neural responses or structures and proposed that they constitute the *bridge locus* between the phenomenological data and the neural substrate. This view is not surprising given the advent of brain-imaging techniques in which "hot" regions light up during a cognitive performance. Or at the cellular level, for instance, illusory contours (in which edges that are clearly perceived do not correspond to any physical edges)

activate specific neurons in the visual cortex that respond to these illusory contours. As Thompson *et al.* (1999) have discussed extensively, the thesis works on the form of a family of arguments, the so-called linking propositions. For our purposes here, an important class is:

$$\phi \text{ "looks like" } \varphi \Rightarrow \phi \text{ "explains" } \varphi.$$

Here, ϕ are neural-psychological terms, and φ are phenomenal terms, and the implication operator has a conditional sense: if the empirical events "look like" the phenomenal events, then these are explained. Linking propositions are a direct inheritance from Mach's principle of equivalence and its later variants. As Thompson *et al.* (1999) explain:

> Two basic ideas are involved here. The first is that the way things seem to the subject must be represented neurally in the subject's brain. The second is the idea that, in analyzing visual perception, one must arrive at a "final stage" in the brain a bridge locus where there is an isomorphism between neural activity and how things seem to the subject . . . We will refer to this idea as *analytic isomorphism.*

These ideas lean close to the spontaneous philosophy of a number of neuroscientists and also to a traditional eliminativist approach. The shortcomings are numerous, and they can be quite precisely spelled out for detailed cognitive phenomena, e.g., filling-in, preparation for movement, or temporal perception. When cognitive scientists do take phenomenological data into account, this is one of the most common ways.

Second, regarding phenomenal isomorphism, a further and stronger interpretation of the "no-man's land" in the above diagram is to postulate that the link is isomorphic, not at the level of neural events and cognitive events, but at the structural level at which the empirical and phenomenal interplay. The cognitive neuroscientist needs to take into account the phenomenological evidence in order to *identify* properly the right explanatory mechanisms on the neural and subpersonal levels. As Gallagher puts it, this isomorphic approach "appears to take phenomenology as a strong constraint in the following manner . . . the causal mechanism to be identified on the sub personal levels [i.e. neural-bodily] needs to be [phenomenally] isomorphic with details explicated in the phenomenological account" (Gallagher 1997, 208). To distinguish this approach from simpler analytical isomorphism, I have appended the modifier

"phenomenal." This is, then, a far cry from the bridge locus, since the scope is expanded to include an entire process or mechanism, and by this very move, to provide constraints on the type of empirical interpretation that can be valid. A good example is the retention protention description of time consciousness. This analysis sharply precludes a naturalized account of time mechanisms based upon computational informational approaches to temporality, which still are considered possible as empirical models (see Broadbent and Church 1900). In the case of the sound modality it requires a sound to be stored; algorithms for recognition then would start operating in a sequential manner, and the end result would be the "awareness" that a sound has occurred. These models have the same temporal structure as the Meinong and Brentano interpretation, and, thus, they are subject to the same criticisms (Gallagher 1998; van Gelder 1999).

The aforementioned example provides a reasonable and productive option, one with several variants depending upon the degree or force of the constraint that one allows phenomenology to provide. Furthermore, in the case at hand, one is tempted to say that establishing this isomorphism provides an account of the actual mechanism that underlies time consciousness. This conclusion would be, of course, unjustified: there is no a priori reason why the phenomenological description should somehow give *direct insight* into the nature of the causal process that underlies that phenomenological appearance. The perceived image on a TV screen is only weakly related to the electronics of the device. Thus, one can hold to a weakly isomorphic view that finds correspondences but does not expect mutual constraints at a level other than a confirmation of appearances. In this sense, the isomorphic option retains neat disciplinary boundaries and a division of labor. The job of phenomenology is to provide descriptions relevant to first-person phenomena, while the job of the natural sciences is to provide an explanatory account in the third person. Both accounts are joined by a shared logical and epistemic accountability that is consistent only at the level of description but not necessary at the level of explanation. But is the isomorphic option really possible, or even productive? Is this not another form of psycho-neural identity theory in a phenomenological garb? Are description and explanation so neatly distinct?

Finally, third, regarding "generative passages," a more demanding

approach will require that the isomorphic idea is taken one step further in order to provide the passage in which the mutual constraints not only share logical and epistemic accountability, but in which they further are required to be operationally *generative*, i.e., an approach in which a mutual circulation entails that neither domain is intelligible without the insight provided by the other. In other words, we must be prepared to generate in a principled manner reduction analysis and eidetic descriptions that are rooted explicitly to biological emergence.

For this to occur, we must have at our disposal the following three dimensions already set in place for the study of retention: (1) a level of *formal* precision to make this passage possible in the realm of ideal or mathematical descriptions; (2) a level of *natural* process situated as a junction between the appropriate global level and its corresponding local sources; and (3) an explicit and *pragmatic* locus in which lived experience and the bodily and material interpenetrate. These three dimensions and their articulation give substance to the notion of mutual constraints as generative passages, and their explication will complete the work of this chapter.

DYNAMICS AND THE FORMAL IMPERATIVE

Phenomenology as (strong) parallel to mathematics

In the effort to build a proper strategy for a naturalized phenomenology, the nature of the link between phenomenology and the natural sciences is clarified to the extent that we conduct research and the work is actually *done*. In fact, in the present case study, the key role played by the dynamical tools is critical. The role of this level of ideality, or categorical meeting point, must be examined more carefully.

This is reminiscent of an idea put forth by Husserl, that phenomenology is to the science of mind what mathematics is to physics, as if psychology should "consider the 'instrument' of phenomenological eidetic theory to be no less important, indeed at first probably very much more important, than mechanical instruments" (Husserl 1980, 48). Husserl continues, "The metaphor of the instrument naturally ought not to be pressed. The phenomenological method, of course, enters just as little into competition with the experimental psychological one as do the mathematical methods in physics with the

physical ones" (Husserl 1980, 49). The analogy is limited, of course, but still it is very illuminating in that it reveals much about the role of formal descriptions in the approach followed here (Marbach 1988). Properly relevating the structural invariants of experience opens the door for the appropriate domain of formality.

The case of temporal experience in general, and the specific case of retention, are exemplary. In the study of temporal object-events, objects appear as rigorous collections not immediately subject to empirical constraints. Still, they appear close to a dynamical picture that is neutral with respect to any metaphysical underpinnings. As in the case of mathematics, in relation to material objects, phenomenology allows one to bring to the fore a unique, universal property of mental phenomena, namely the manner in which they are, in fact, conscious. This level of description, known only diffusely in "the natural attitude," is immanent to lived experience. As in the case of the tripartite structure of temporality, and in the specific case of retention, the superficial awareness of temporality becomes the theme of a systematic analysis that manifests as the structural or latent manner of appearance.

Dynamics, emergence, and regional ontologies

Husserl's analogy becomes more poignant if we move now to consider the strictly mathematical, dynamical description as the necessary level of analysis of the bodily inscription brought forth by our sketch of retention. During Husserl's life, the main formal tool used in psychology was logic: in his early investigations, Husserl turned to logic, but he soon abandoned it for a transcendental turn. He hardly can be faulted for doing so, since no information about nonlinear dynamics was available at that time, let alone about their interface with neuronal and cognitive events.

In fact, what is unique about modern dynamical tools within science is a radical reconfiguration of various domains of ontology. As mentioned previously, the cognitive science project of naturalizing the mental has grown out of a new scientific context mixing two scientific "revolutions" in the formal sphere. One is the theory of computations and rule-based systems and the other is the theory of complex or self-organizing systems. Although a sophisticated theory of computation is at the foundation of the symbolic approach and the birth of cognitive science, the theories of complexity are at

the base of the shift to connectionism and its further elaboration as embodied cognitive science.

The central point of this scientific revolution, the import of which is yet to be fully appreciated by many outside science, is that complex systems are endowed with global emerging properties generatively produced by the lower-level components and their interactions. There is, by now, a large repertoire of such regional theories, explicit models, and their corresponding empirical observations from lasers, clouds, earth tectonics, ecological, genetic, and immune networks, morphogenesis, and phylogeny. For example, neuron-like elements interconnected by (more or less) biologically realistic rules have explained a number of cognitive abilities such as associative memory, figure/ground completion, and motor performance with amazing grace.

These complex systems linking global to local are quite unrelated to the classical mechanical views of causality and explanation. Unlike mechanical systems, most of what occurs is determined by the internal regulation of these systems, which keeps them within a domain of viability instead of at a preset point attractor. Correspondingly, there has been a growth of tools such as nonlinear regions of attraction, structural stability, and bifurcations, a new role for prediction in the theories of chaos and fractals, and ideas on self-organized criticality and genetic algorithms, to name a few.

The key point I wish to emphasize is that these major scientific developments break down the traditional opposition between matter and life, thereby providing substance to a modern account in which such dialectical contraries are simply no longer relevant. Similarly in the cognitive sciences, the traditional opposition between body and mind, or between the biological organic base and the mental and cognitive properties, also is erased as a fundamental gap. In both cases, the erasure of the traditional ontological barriers is accomplished non-reductively, since the new theoretical moves actually *retain* the specific properties of both traditional regions.

Retention provides us with an almost perfect example, since it is a region of lived experience with a long and distinct phenomenological history. We describe this approach further by means of dynamical trajectories in a landscape formed by coupled oscillators. Dynamics provide a universal account of such a category of phenomena, complete with a variety of geometries for the basin of the trajectories and phase transitions, all of which concepts would be unthinkable

outside the formal tools we have been considering. Such trajectories are, in themselves, metaphysically neutral, so they cannot be assimilated *ipso facto* to a hidden form of material dualism.

The example of retention makes sense of the search for a naturalization by mutual constraints, not only as a philosophical stance, but also as a research program. In this sense, the naturalization project already is engaged in multiple forms, even though it still is not thematized explicitly with respect to lived experience.

Returning now to phenomenological reduction as an instrument for a proper psychology, the role of formal models is as crucial as it is in physics. The stages in the research program can be described as follows:

Phenomenological Data → Descriptive Invariants → Mathematical Models → Mathematical Descriptions → Naturalistic Implementations.

The critical role of formal tools is, in short, based on the Janus-faced nature of structural and mathematical ideals: they provide eidetic invariants which can, in turn, be linked immediately to a naturalistic embodiment or implementation.

REDUCTION AND THE PRAGMATIC IMPERATIVE

The methodological basis of phenomenology as practice

Here, we argue that it is not enough to naturalize phenomenological descriptions that have come down from Husserl or from some of his immediate successors. For a proper research program, we must carry out the scientific work and also undertake new phenomenological descriptions. In other words, we take phenomenology as a domain of *investigation*, and not a corpus of fixed knowledge. The study of sound retention provides us with a minimal example of how such a fresh re-enactment of descriptions that seem consecrated (e.g., the tripartite structure of time) continuously provide new insights and intersubjective validation. For this to be so, the basic nature of the method(s) of phenomenology must be made precise and distinguished from those of experimental cognitive psychology, though both disciplines certainly have their roles to play.

As is often repeated, phenomenological study proper must begin by an explicit gesture of *reduction* (certainly Husserl made no exception to this rule). To a first approximation, reduction starts by a

disciplined suspension of the habitual attitudes, a bracketing, which is opposite to a third-person objectification, but which involves instead a return to the world as it is experienced in its immediacy. Reduction also can be described as a special type of reflection: not to consider a different world, but, rather, to consider the present one differently. As any human aptitude, it is open for investigation.

The concern about reduction as a task or an aptitude contrasts with current usage. On the side of those coming from cognitive science and interested in naturalizing phenomenology, the lack of interest probably indicates their reluctance to induce a rather important shift in current scientific practices incorporating a new skill in order to explore a required new domain of data. On the side of those interested in philosophical phenomenology *tout court*, the lack of interest is more puzzling, and it is touched upon only occasionally (Bernet 1994).

Neither attitude will do. Indeed, what is needed is a *pragmatics*, a method that receives both a sustained effort to theorize it, as well as an explicit prescription for its cultivation and training over time. At its base, reduction may be dissected into four intertwined moments or aspects: (1) inducing the attitude of suspension; (2) gaining intuitive evidence concerning a specific domain; (3) providing descriptive invariants and intersubjective validation; and (4) long-term training to acquire expertise in 1–3 (Varela 1996; Depraz 1999).

In the first case, attitude, or *époché*, either is triggered or self-induced, and the crux of the phenomenological examination is the issue of how to perform this reversal. The point is to turn the direction of the movement of thinking from its habitual, content-oriented direction backwards towards the arising of thoughts themselves. This is no more or less than a form of the human capacity for reflexivity. To engage in reduction is to cultivate a systematic capacity for reflexiveness, thus opening up new possibilities. It also involves a complementary gesture of letting go of such heightened focusing.

The second movement involves intimacy and intention. The result of reduction is that a field of experience appears both less encumbered, and more vividly present, as if the habitual distance separating the experiencer and the world were dispelled. According to William James, the immediacy of experience thus appears surrounded by a diversity of horizons to which we can turn our interest. This gain in intimacy with the phenomenon is crucial, for it is the

basis of the criteria of truth in phenomenological analysis and also is the nature of its evidence. If intimacy or immediacy is the beginning of this process, it continues by a cultivation of imaginary variations, which, in the virtual space of mind, involve multiple possibilities concerning the appearance of the phenomenon.

The third movement involves providing descriptive invariants. To stop at reduction followed by imaginary variations would be to condemn this method to private ascertainment. The next component is as crucial as the preceding ones: the gain in intuitive evidence must be inscribed or translated into descriptions of the right level (see above). In other words, we are not merely talking about an "encoding" into the public record, but rather an "embodiment" that incarnates and shapes what we experience. I like to refer to these public descriptions as invariants, since it is through variations that one finds broad conditions under which an observation is communicable.

The fourth movement involves training and stability. As with any discipline, sustained training and steady learning are key. A casual inspection of consciousness is a far cry from the disciplined cultivation of the aptitude for reduction. This point is particularly relevant here, for the attitude of reduction is notoriously fragile. If one does not cultivate the skill to stabilize and deepen one's capacity for attentive bracketing and intuition, and if one does not improve one's skill in illuminating descriptions, no systematic study will mature. This last aspect of the reduction is perhaps the greatest obstacle for the constitution of a research program, since it implies, from a community of researchers, a disciplined commitment to build a sustained tradition of phenomenological examination. Such a tradition is almost entirely nonexistent in Western contemporary science and culture at large.

The universal pragmatics of experiencing

Even this rapid examination of first-person methodologies uncovers a number of deep, disturbing challenges. Let me quickly sketch three of them. First, concerning phenomenology itself, a major challenge is to lay bare each one of these aspects of reduction, i.e., to transform them into a phenomenological *pragmatics* beyond vague usage. The failure to make reduction into a concrete method through these steps is, in my eyes, the most undeveloped theme of post-Husserlian

phenomenology. As a result, a substantial amount of phenomenological literature has strayed into textual analysis and repetition of descriptions from Husserl or others, without the disciplined engagement to refashion such descriptions afresh.

Second, beyond phenomenology itself, we must consider to what extent a unity or a multiplicity of methodologies exists for the examination of experience. In the West, beyond phenomenology, there are the much criticized introspectionist schools in early twentieth-century psychology, which are having a second day in court (Vermersch 1999). But there also are a number of non-Western wisdom traditions, e.g., Buddhism, Taoism, gnosticism, that patiently have cultivated highly detailed "know-hows" (Varela 1999a). In such traditions, the method of exploring one's experience is the key to the path of spiritual transformation. The challenge that these multiplicities of sources raise is whether there exists a homology between methods. Is there such as thing as a basic structure shared by these various pragmatics of experiencing?

This topic is too important to be discussed in a succinct manner. In a recent collaborative work, we have found evidence to think that indeed there is a commonality for the examination of experience, which entails a greater degree of closeness between religious experience and cognitive science than normally suspected (Depraz, Varela, and Vermersch 1999). In a thumbnail sketch, the description of the practice of any form of reduction must be seen as embedded within a larger project which aims to recapture the different steps in a process whereby something of myself comes into my clear consciousness, something which inhabited me in a way which was confused, opaque, affective, immanent; that is, pre-reflective. According to the demands of the disciplines called upon, essentially philosophy, psychology, and the cognitive sciences in general, spiritual traditions (Tibetan Buddhism and, albeit more tangentially, the Orthodox prayer of the heart) variously have called this act of becoming aware "phenomenological reduction," "a reflective act," "becoming aware," and "the practice of mindfulness."

The basic structural dynamics shared by all these traditions can be described as follows: (1) a basic cycle, constituted by the reductive gesture of redirection, the basis of intuitive obviousness that supplies the criterion of truth of the act; (2) two optional steps, expression and validation, which allow the communication and manifestation of the act; and (3) the multilayered temporality of the act of

becoming aware, lending the necessary dynamic to the description in action. This amounts to saying that *époché* constitutes the real heart of the act of becoming aware under two headings: as the initial step, it primes the dynamic of the ensemble and gives the starting impulse; as a movement carrying across the other descriptive steps of becoming aware, maintaining the required quality of presence for such an experience.

A final, important challenge is that first-person methods represent a call for transforming the style of the scientific community itself. Unless we accept that, at this point in intellectual and scientific history, some radical relearning is necessary, it will be difficult to move forward into a productive interface with cognitive science. But this can happen only when the entire community adjusts itself to the corresponding acceptance of arguments, refereeing standards, and editorial policies in major scientific journals, so that this added competence is an important dimension of a young researcher. It requires us to leave behind a certain image of how science is conducted, and to question a style of training in science that is part of the very fabric of our cultural identity.

The specific domain of reduction

As presented, the pragmatics of exploring experience is a very specific gesture. Its unity lies not only in what is done, but also in the inescapable ontological region in which it occurs the lived body (*Leib*). In ordinary experiences, and even more so in spiritual ones, the feeling-tone of intimacy and directness is essential. Experience is Janus-faced. On the one hand, it is a "pure" domain, which may (or may not) be described by the eidetic invariants proper to one's personal experience. However, it is also an event linked to the temporality of the world, and, more precisely, to the world as it manifests in the biological rhythms of my body. In this sense, the practice of this reductive gesture unfolds, I submit, a distinct region of ontological reciprocity characterized by the manner in which specific entities show up within it. Its distinct, immanent constitution, i.e. what is given, is given in a sphere which is *mine*. This specific region is inhabited or discloses entities and events inseparable from the presence of the lived body in all of its complexity. The list is extensive, and it contains numerous examples from Husserl (see Depraz 1998; Merleau-Ponty 1964). More recent authors have

examined development in children (Meltzoff and Gallagher 1996) and in medicine (Toombs 1995), and the topic also encompasses the religious and spiritual domains (see Varela 1999a; and also the work of Edith Stein).

Unlike the regional ontologies of material or ideal objects, this region is not extensively full; instead, it is *connectively productive*. The connectivity appears as the manner in which the entities and events interpenetrate and are transparent, both towards the material basis (they otherwise would remain unbridgeably detached), and also towards the experiential domain (they otherwise would remain floating, disembodied idealities). As Depraz puts it: "Le vécu, à la fois transcendental et incarné, est le milieu commun d'une nature et d'un esprit phénoménologisé . . . Contrairement à la dialectique hégéliene du moins . . . [la phénoménologie] laisse transparaître le régime duel d'experience au moment même où elle reconstitue son mouvement de formation" (Depraz 1999). Clearly, the reciprocity *Leib/Körper* is not available in all its enormous import as long as one remains in an attitude of unexamined experience, that is, within the natural attitude. Going beyond requires sustained cultivation of the reductive attitude to be fully applied, and this sends us back to the pragmatic imperative.

MUTUAL CONSTRAINTS: A TRIPLE-BRAIDED GENERATIVE LINK

Let me now draw together the strands of our argument. A main lesson is that the enterprise of neurophenomenology has taken us into the thicket of philosophical and methodological renewal. If this direction of research is to provide an answer to the otherwise unbridgeable explanatory gap between the cognitive and the phenomenological mind, it cannot ignore the constitutive basis of the mutual reciprocity that makes the mental and experiential, and the bodily and neural, cohere. Thus, it is evident that only from this renewed basis can a neurophenomenology be other than a repetition of the past, in the form of searches for correspondence, between cognitive science and phenomenological data (be it through bridge locus or isomorphism).

This mutual reciprocity without residue is the very nature of the region unique to the *Körperleib*. In the end, in this ontological region in which reciprocity manifests in all its vividness, three main threads must be woven together on an equal footing to provide a seamless

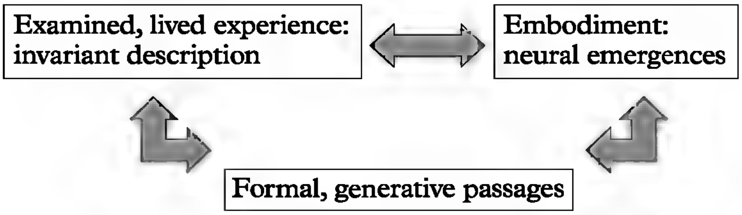

Figure 3

braid of continuity between the material and the experiential, the natural and the transcendental. In other words, we have identified three poles in the mutual circulation we have been examining: (1) the formal level, since eidetic descriptive structures and implementation partake of the same mode of ideality and, hence, are effectively on common ground; (2) the natural (i.e., neural, bodily) process considered at the right level, spanning global emergence and local mechanisms, which assures a direct relevance to both psychological content and to a detailed neuroscientific examination; and (3) the pragmatic level of examination, which opens up to the *Leib/Körper* transition since it, and it alone, can access a non-dual position that excludes neither experience nor body, and provides the relevant basis or data for (1) (2).

To summarize, the triple-braid of mutual constraints operates so that examined, lived experience (invariant description) influences and is influenced by embodiment (neural emergences), which influences and is influenced by formal, generative passages, which then link back to influence and be influenced by examined, lived experience (see figure 3). These three poles do not simply stand in a static or structural relation; instead, they stand in a mutually generative relation in the sense that each one requires the others to make any sense. None of them in isolation can suffice. In the case of retention, the mutual constraints are, by now, quite explicit. If we take away any of these three threads of the braid, the entire enterprise is flawed on one side or the other. Take away all three together, and the interpenetration of domains and their reciprocity is apparent.

Generally speaking, we have: (1) the dynamical analysis of trajectories arising from synchronous oscillators; (2) the emergence of a large-scale integration of multiple cognitive sub-components into a moment of cognition that is downwardly effective at the local neural

level; and (3) the phenomenology of nowness under examination, revealing a constitution that is both experientially meaningful as pure experience and structurally precise as fertile data for a dynamical description.

This triple-braid provides, I propose, the foundation for an important renewal in philosophy and science towards a non-dual thinking that is not declared by decree but is found at our very doorstep. Only a generative, mutual reciprocity can replace the age-old friction of duality that haunts both cognitive science and also the spiritual traditions. We may glean the shape of such future thinking by examining lived experience as unfolding its intimate links with the lived body, the very manifestation of transcending nature.

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CHAPTER 10

Religion and the frontal lobes

Patrick McNamara

INTRODUCTION

The chapters in this volume attest to the last decade's achievements in the scientific study of religion. These advances have been achieved in the same ways advances are achieved throughout the natural and human sciences namely, by the adoption of experimental approaches to the phenomena that need to be explained. In this case, the phenomena that need to be explained are collectively known as 'religion.' In prior years, progress in the adoption of experimental techniques for the study of religion was stymied by the lack of consensus on the nature of the object to be studied. If "religious experience" was taken as the proper object for the scientific study of religion, then religious experience needed to be very precisely defined. But this task the task of identifying the essentials of religious experience dropped the whole problem back into the laps of the philosophers. Experimentalists were obliged to sit out debates on the phenomenology of religious experience and on the nature of experiential feels or "*qualia.*" Unfortunately, philosophers could not agree to what, exactly, the term "religious experience" referred, nor could they agree on what "experience" itself was, never mind the more "ineffable" varieties of it. Thus, progress in development of a scientific understanding of religion was slow relative to progress in the rest of the human sciences.

The publication of this volume signals a dramatic change in course. None of the authors in this volume focus exclusively on providing an account of religious experience. Rather, they are interested in relatively well-defined components of religious behaviors, such as belief-fixation and belief-transmission; attributions of agency and intentionality to other "Minds"; the tendency to anthropomorphize novel events or objects; the processing of counter-

intuitive mental representations; cognitive constraints on religious representations; the well-formedness properties of religious rituals; the links between religious representations and the emotions; the development of god concepts in children; and so on. This is not to say that the study of religious experience is abandoned or condemned. Rather it is simply bracketed in favor of a componential analysis of basic processes of religious cognition.

The focus on these relatively well-defined and basic components of religious practices is an advance from the point of view of the cognitive and neural sciences because *we can plausibly localize many of these components to the frontal lobes* and this neuropsychologic link provides a new and powerful tool with which to study religious phenomena. In what follows I review the evidence for a link between basic components of religious cognition and the frontal lobes. I begin with a summary of the functions and anatomy of the frontal lobes and then proceed to a review of the evidence for frontal mediation of basic components of religious cognition such as agency and "Theory of Mind" (ToM), self-consciousness, belief-fixation, the pro-social behaviors of empathy and moral insight, and emotional experience. I conclude with a discussion of the implications of frontal involvement in religious cognition for a theory of religion itself.

EXECUTIVE FUNCTIONS AND RELIGIOUS COGNITION

The prefrontal lobes mediate what are commonly known as the "executive cognitive functions," or ECFs. ECFs refer broadly to cognitive activity involving the planning, initiation, maintenance, and adjustment of non-routine and goal-directed behaviors. Commonly seen clinical manifestations of ECF deficits include lapses in attention, social disinhibition and loss of impulse control, lack of insight, depressive affect, cognitive inflexibility, behavioral rigidity, Theory of Mind impairments (in which the individual fails to empathize with or ascribe attributes of mind to others), distractibility, and impaired abstract reasoning (Barkley 1997; Dagenbach and Carr 1994; Fuster 1989; Goldman-Rakic 1987; Grattan *et al.* 1994; Oscar-Berman, McNamara, and Freedman 1991). ECFs are considered together as a special category of cognitive functions by neuroscientists because ECF impairments are invariably associated with prefrontal lobe dysfunction. When prefrontal dysfunction

occurs, one or more ECFs are selectively affected while other higher cognitive functions, such as language, memory, visuo-spatial, and praxis functions, are spared (Barkley 1997; Cummings 1993; Fuster 1989; Goldberg 1987; Passingham 1995).

FRONTAL LOBE ANATOMY AND FUNCTION

The frontal lobes increase in size and connectivity with both phylogenetic and ontogenetic development (Banyas 1999; Fuster 1989; Goldman-Rakic 1987; Passingham 1995). They are not fully myelinated until the adolescent or adult years. They receive projections from the mediodorsal nucleus of the thalamus and make up the large expanse of cortex in the anterior portions of the brain. They comprise primary motor cortex, as well as premotor, supplementary motor, and prefrontal areas. All of these areas send inhibitory efferents onto their sites of termination. The motor premotor areas comprise Brodmann areas 4, 6, parts of Area 44 (Broca's area), and the frontal eye fields. The prefrontal areas are further subdivided into two large functional regions. The first prefrontal region includes paralimbic cortex of the anterior cingulate region and orbitofrontal cortex. The second prefrontal region is generally referred to as the dorsolateral prefrontal region and includes Brodmann areas 9, 10, 11, 12, 45, 46, and 47. Damage to the primary motor area is associated with paralysis. Damage to the premotor area is associated with disturbances in the organization of movements. Left-sided premotor lesions in Broca's area usually lead to a non-fluent aphasia with preserved comprehension of speech. Supplementary motor lesions are associated with difficulties in the initiation of movement. Dorsolateral and orbitofrontal lesions are associated with a variety of "higher-order" functional deficits, which will be discussed below.

Much of the functioning of the frontal lobes can be inferred from its patterns of connectivity (Cummings 1993). The dorsolateral division exhibits greater interconnectivity with basal ganglia sites than does the orbitofrontal division and the orbitofrontal division is densely interconnected with limbic sites. Prefrontal sites are interconnected with virtually all other cortical sites. Projections from these sites to other cortical sites are typically onto layers I, V, and VI the output layers of the cortex. This implies that the frontal lobes are in a position to inhibit and regulate the output of other cortical

regions. The prefrontal cortex is the only cortical region which directly regulates neurotransmitter nuclei in the brain stem (catecholaminergic and serotoninergic nuclei) and also cholinergic nuclei in the basal nucleus of Meynert (Arnsten *et al.* 1999; Goldman-Rakic 1987). Because these neurotransmitter projections project diffusely to all regions of the cortex, the frontal lobes can influence global cortical arousal levels.

The frontal lobes are densely innervated by dopaminergic (DA) fibers originating in the ventral tegmental area (VTA) and the substantia nigra (SN) (Arnsten *et al.* 1999; Randolph-Swartz 1999). The nigrostriatal system indirectly influences the frontal lobes through the basal ganglia. The system originates in the pars compacta of the SN and terminates in the basal ganglia. The caudate nucleus within the the basal ganglia communicates with the prefrontal lobes. The mesocortical system originates in the VTA and terminates in the ventral striatum, amygdala, nucleus accumbens, and the frontal lobes. There is some evidence that executive functions of the frontal lobes depend in part on dopaminergic activity in the frontal lobes. Lange *et al.* (1995) found that patients with Parkinson's Disease were dramatically impaired on executive function tests (Tower of London task, set shifting, working memory, and spatial attention span) only when withdrawn from dopaminergic "levodopa" medication. Performance on non-frontally-mediated tests, which involve visual analysis and matching, was not impaired when patients were off levodopa.

AGENCY AND THEORY OF MIND (ToM)

When human persons postulate a god or pray to a god, they are attributing certain cognitive properties to that god among them, the property of possessing a "mind" (henceforth Mind). In order, however, to be capable of attributing Mind to others, or to a god, the pray-er must possess these properties of Mind him- or herself. There is a fairly large literature in the cognitive and neural sciences on the so-called Theory of Mind mechanism (Baron-Cohen 1995 for review) that is relevant here. Baron-Cohen's componential analysis of the proposed module involves two systems that likely depend on frontal networks: the intentionality detector and the Theory of Mind (ToM) mechanism itself. The intentionality detector assigns intentional states such as goals and desires to animate objects. The ToM

mechanism constructs complex mental representations of intentional mental states such as thinking, deceiving, pretending, and believing. In addition it is capable of attributing these mental states to other agents or persons. A person possessing a ToM mechanism would be able to predict the actions of others and would also be able to detect deception and manipulation. Baron-Cohen points out that pretend play — a sign of a functioning ToM mechanism — begins to emerge in children as early as eighteen to twenty-four months. By three years of age children can perceive that others can hold false beliefs. For example, they can act on or take advantage of the knowledge that a companion believes that a toy is in one room when in fact it is in another room.

While Baron-Cohen suggests that the intentionality detector may be localized in the superior temporal sulcus, he seems to base this surmise on reports that some cells in the superior temporal lobes fire significantly more often when the animal observes some other animal behaving like an agent. Such an argument of course would only carry localizing weight if we recorded cell firings in other parts of the cortex and observed no such significant rise in firing when the animal observed other animals behaving like agents. But no such data exist. It is more likely that any intentionality detector would involve the frontal lobes since identification and attribution of beliefs, goals, and desires (i.e. intentional states) to others does appear to depend on the frontal lobes. Comprehension of agency, ability to "will," resistance to interference, ability to plan, and ability to develop intentional states or intentionality — all fundamental processes of ToM mechanism — depend, in part, on neurocognitive networks in the frontal lobes (Barkley 1997; Cummings 1993; Fuster 1989; Goldberg 1987; Leslie 1996; Passingham 1995). Impairments in ToM mechanism processes have been documented in antisocial psychopaths and in certain types of autistics (Baron-Cohen *et al.* 1994; Baron-Cohen 1995, 1998; Damasio *et al.* 1991a and b). The impairments in both cases have been linked to orbitofrontal lobe dysfunction but are associated, of course, with varying manifestations of the underlying disorder. Similarly, varying degrees of ToM impairment may also occur in adults with orbitofrontal dysfunction (Damasio *et al.* 1991a). These clinical studies have recently been confirmed with data from activation studies. Baron-Cohen (1998) cites two blood flow studies that implicated orbitofrontal sites in ToM processes.

Focusing on matters of agency, intentionality, and ToM mechanism with respect to religious phenomena immediately results in a number of new ways to test hypotheses concerning a given theory of religion. For example, if the attribution of Mind to others (whether real or imaginary) is fundamental to most or all types of religious practices, then impairments in ToM mechanism processes should impact religious practices. Although I know of no studies that examine religious ideas or practices in patients with orbitofrontal lesions and ToM mechanism impairments, it is known that some of these patients and some autistic subjects seem incapable of experiencing empathy for another (see Baron-Cohen 1995; Damasio *et al.* 1991a; Eisenberg and Strayer 1987). As far as I know, no one has investigated the development of religious and related ideas in autistic children. We do not know, therefore, whether religious ideas develop normally in children with autism or with prefrontal lobe dysfunction. If god concepts do not develop normally in children with ToM mechanism impairments, then the hypothesis that ToM mechanism processes are crucial for religious ideas is supported. Of course we would need to link ToM mechanism processes and development of god concepts more closely before any conclusions about causality can be drawn. A finer differentiation is possible as well: if concepts about superhuman agents develop differently than concepts about human agents in normal children without ToM mechanism impairment, and if subcomponents of the ToM mechanism handle development or processing of superhuman or supernatural agents rather than human agents, then it is possible that some children (and adults for that matter) with ToM mechanism impairments will evidence selective difficulties with postulating superhuman agents. Would we call these individuals more rational than their unimpaired counterparts since they appear to refrain from postulating superhuman agents while their normal counterparts do not?

EMOTIONAL PROCESSING

Emotional responses are an integral part of all aspects of religious cognition, from affective prayer to participation in solemn ritual. Devotion to religious ideas can be so extreme as to claim the life of the believer. Indeed, martyrdom for the "faith" is held to be a virtue in several religious traditions, particularly in Christianity and Islam. This extreme emotionalist aspect of religious phenomena would be

hard to explain if we localized religion to any other aspect of the brain besides the frontal lobes. There is no evidence for substantial emotional functions in occipital, parietal, or temporal lobes. Traditional neuropsychology placed emotion in the limbic system but we now know that the limbic system itself is regulated by orbital frontal cortex and the frontal lobes participate directly in emotional processes. Data from clinical lesion studies, electrophysiologic studies, and PET activation studies suggest that the left frontal lobe normally mediates positive emotions and the right frontal cortex mediates negative emotions (see reviews in Bear 1983; Borod 1993; Davidson 1995; Gainotti *et al.* 1993; Starkstein and Robinson 1991; Tucker and Williamson 1984). Left frontal damage, for example, is far more likely to cause depression than are similar lesions to the right frontal cortex (Royall 1999; Starkstein and Robinson 1991). Conversely lesions in the right orbitofrontal cortex are more likely to lead to mania and unconcern than are similar lesions on the left (Bear 1983; Borod 1993; Damasio 1996). Electrophysiologic studies consistently demonstrate right anterior activation during aversive emotional states in both animals and humans (Davidson 1995). Patients with primary depression perform poorly on tests of left frontal function (indicating release of right frontal function) (see Royall 1999 for a review).

Dopamine neurons of the ventral tegmental area (VTA) and the substantia nigra (SN) that project in the meso-cortical tracts to the frontal lobes have long been associated with the reward and pleasure systems of the brain. Virtually all of the known addictions (including cocaine, heroin, amphetamines, alcohol, food, and sex) exert their addictive actions, in part, by prolonging the influence of dopamine on target neurons (Randolph-Swartz 1999; Schultz *et al.* 1995). VTA DA neuron responses appear to be necessary to facilitate formation of associations between stimuli that predict reward and behavioral responses that obtain reward (Schultz *et al.* 1995). The optimal stimuli for activating DA neurons are unexpected appetitive rewards, whereas fully predicted stimuli are ineffective. DA activity appears to link stimuli predicting reward to the response-facilitation mechanisms in the nucleus accumbens and basal ganglia.

In summary, the frontal lobes specialize in emotional processing and to the extent that religion involves emotion it must involve the frontal lobes.

PRO-SOCIAL BEHAVIORS OF EMPATHY AND MORAL INSIGHT

All religions claim to promote pro-social behavior and it must be said that improved empathy and moral insight can be acquired via religious practices. Fundamental to the ability to engage in moral choice, empathy, and pro-social behaviors in general is the ability to delay gratification of one's own impulses. Freud argued that the ability to inhibit sexual and aggressive impulses is a prerequisite for social and civilized behavior. If individuals can derive real benefits (e.g. a larger return later) by learning to inhibit current appetitive or consumatory responses, then natural selection would favor those individuals with the ability to delay gratification of impulses. The child's acquisition of the ability to delay gratification of impulses develops in tandem with maturation of the frontal lobes (Samango-Sprouse 1999). In adults prefrontal lesions are often associated with ECF deficits and disinhibition of drives and aggression (Benson and Blumer 1975; Fuster 1989; Pincus 1999; Schnider and Gutbrod 1999). One of the most disabling impairments associated with traumatic brain injury (which impacts primarily prefrontal cortex) is loss of the ability to delay gratification of prepotent or previously rewarded responses (Schnider and Gutbroad 1999). Relaxed inhibitory control over appetitive and sexual drives leads to inappropriate social behaviors that prevent the patient from returning to full functional independence. Early evidence for a role of the frontal lobes in supporting the ability to inhibit impulsivity came from the 1868 report of the physician Harlow on his patient Phineas Gage. Gage, a railway workman, survived an explosion that blasted an iron bar (about four feet long and one inch wide) through his frontal lobes. After recovering from the accident Gage's personality changed. He became irascible, impatient, impulsive, unruly, and inappropriate (Benson and Blumer 1975). The damage had mostly been in the orbitofrontal region of Gage's frontal lobes.

Some models of moral development posit a central role for the capacity for fellow feeling or empathy and sympathy. The emergence of empathy and sympathy and the other social emotions constitutes prerequisites for mature moral behavior and very likely depends on the frontal lobes (Ross *et al.* 1994). Having a Theory of Mind (ToM) allows one to impute mental states (thoughts, perceptions, and feelings) not only to oneself, but also to other individuals. This to some extent involves empathy and supports development of sym-

pathy. Humphrey (1983) suggests that this empathic kind of awareness evolved in humans because it was a successful tool for predicting the behavior of others. Humphrey claims that the best strategists in the human social game would be those who could use a Theory of Mind to empathize accurately with others and thereby be able to predict what the others would do in any given situation. This empathic awareness would be fundamental to what Byrne and Whiten (1988) call "Machiavellian intelligence" the social skill to manipulate others for one's own benefit. "Mind-reading" and predictions of others intentions and behaviors all involve attributions of agency and Mind to others. The frontal lobes are crucial for all of these abilities.

One way to investigate the role of the frontal lobes in supporting pro-social behavior is to investigate neuropsychological correlates of anti-social behavior. "Sociopaths" are by definition anti-social individuals and the evidence for prefrontal dysfunction in these individuals is accumulating rapidly (Damasio *et al.* 1991a and b). Sociopaths typically exhibit an inability to empathize with others, egocentrism, an inability to form lasting personal commitments, and a marked degree of impulsivity. While they may appear to be charming they evidence serious deficits in expression of the social emotions (love, shame, guilt, empathy, and remorse). On the other hand, they are not intellectually handicapped, and are skillful manipulators of others (Davison and Neale 1994; McCord 1983). What little evidence exists suggests that sociopathy is associated with orbitalfrontal dysfunction (Damasio *et al.* 1991a and b; Smith *et al.* 1992). Dorsolateral function, however, is preserved and would explain the lack of intellectual deficit in these individuals.

The more violent forms of anti-social behavior are also associated with frontal deficits. In their review of the literature on neuroimaging in violent offenders, Mills and Raine (1994) concluded that frontal lobe dysfunction is associated with violent offending. Raine *et al.* (1994), for example, found that violent offenders (twenty-two subjects accused of murder) evidenced significantly lower glucose metabolic activation levels in medial and lateral prefrontal cortex relative to controls. High sensation-seekers, criminals, and other individuals scoring high on measures of impulsivity and aggression also show prefrontal and frontal dysfunction as well as significantly lower levels than others of the serotonin metabolite, 5-HIAA (see review in Raine 1993). Serotonin exhibits important modulatory

effects on dopaminergic activity in the frontal lobes (Robert *et al.* 1999). Individuals with psychiatric disorders characterized by disinhibited and aggressive behaviors such as anti-social personality disorder (Deckel *et al.* 1996), sociopaths (Damasio *et al.* 1991a and b; Smith *et al.* 1992), substance use disorders (Tarter *et al.* 1989), conduct disorder (Moffitt 1993), and attention deficit hyperactivity disorder (Swanson *et al.* 1998; Barkley 1997), have all been shown to perform poorly on frontal lobe tests. McAllister and Price (1987) found that 60 percent of psychiatric patients with prefrontal cortical pathology displayed disinhibited social behaviors, and 10 percent displayed violent outburts. Heinrichs (1989) showed that the best predictor of violent behavior in a sample of forty-five neuropsychiatric patients was a prefrontal lesion.

SELF-CONSCIOUSNESS

To the extent that religious cognition involves computations on agency, Theory of Mind (ToM), emotional processing, and belief-fixation, it must also involve self-awareness. Certainly, most religions claim to improve self-awareness. Wheeler *et al.* (1997) have reviewed the literature on deficits in self-awareness and concluded that the frontal lobes are crucial for self-awareness. Patients with frontal lobotomies are the clearest example of impairment in the sense of self after frontal damage. Families of these patients often reported that they could no longer contact the real self of the patient who had received the surgery (Weingartner 1999). Right frontal activation has recently been associated with experience of the self itself (Craik *et al.* 1999). Right frontal sites were activated whenever subjects processed or memorized materials referred to the self. It is unclear how this set of findings on right frontal mediation of self-consciousness will be integrated with earlier findings on the role of right frontal cortex in negative affect.

Interestingly, the right frontal cortex appears to be intimately involved in memory as well (Wheeler, Stuss, and Tulving 1997). Memory is clearly crucial to any enduring sense of identity and self. As Wheeler *et al.* (1997) have pointed out, the act of recall or remembering really involves an experience of the self. Episodic memory or conscious recollection always involves a personal consciousness and to the extent that recall leaves out this sense of self, conscious recollection will not emerge. The information will be

"there" but not available on demand for the subject. In a review of PET studies on episodic encoding and retrieval processes Wheeler, Stuss, and Tulving (1997; also see Nyberg, Cabeza, and Tulving 1996) conclude that episodic retrieval is associated with an increased blood flow in the right frontal cortex with no increased blood flow in left frontal cortex; while episodic encoding is associated with the opposite pattern, i.e. increased flow in left frontal cortex and no increased flow in right frontal cortex. They call this set of findings HERA for hemispheric encoding/retrieval asymmetry. The right frontal involvement, apparently, represents only retrieval set or retrieval mode not actual retrieval of information itself. The right frontal activation can be obtained even when subjects attempt but fail to retrieve items from memory. Actual episodic retrieval, or at least retrieval involving visual images, is associated with activation of posterior (parietal and occipital) cortical sites.

BELIEF-FIXATION

Processes of belief-fixation are central to religious cognition and can be studied neuropsychologically. Once again the frontal lobes play a crucial role. People differ in their openness to foreign or incompatible belief systems. At one extreme are the tiny class of temporal lobe epileptics who experience "multiple conversion syndrome" where differing religious ideas are consecutively adopted as one's own without regard to internal consistency or relevance. These temporal lobe epileptics experience excessive electrical discharges in their temporal lobes and may therefore overactivate frontal systems in an attempt to inhibit chronic temporal activation. At the other extreme of the belief-fixation continuum are persons who are closed to "foreign" ideas of any kind and resist acquisition of any new beliefs at all. These are usually individuals with rigid personality structures. Rigidity in personality structure has been linked to catecholaminergic and frontal dysfunction (Cloniger 1987; Hubble and Koller 1995; McNamara *et al.* 1995).

Persons with right frontal lobe deficits, for example, may often cling to an erroneous belief no matter how much evidence to the contrary is available (see papers in Christodoulou 1986). In Capgras syndrome, for example, the patient believes his wife has been duplicated in every physical respect and thus is an imposter. He realizes it is a fantastic belief but he cannot shake it from his system.

In Othello syndrome the patient is convinced of the infidelity of the spouse and no amount of evidence to the contrary (often presented by a despairing family) will shake the belief. McNamara and Durso (1992) showed that the delusional belief system in one patient with Othello's syndrome was associated with catecholaminergic dysfunction in the frontal lobe. In *folie à deux* two closely related persons, usually a mother and child or an adult couple, hold a delusional belief about their environment despite overwhelming evidence to the contrary. Theorists of these syndromes usually suggest a disconnection between frontal and temporal lobes such that mnemonic information from temporal sites cannot be integrated with control processes in the frontal lobe. In order to persist beliefs must protect themselves from effects of interference or countervailing evidence. This protection probably depends on insulating the belief from evaluation by (anteriorly located cortical systems) insight systems.

SUMMARY

The frontal lobes mediate processes of agency, Theory of Mind (ToM), pro-social behaviors of empathy and moral insight, belief-fixation, self-awareness, and emotional processing. The right frontal cortex in particular appears to mediate negative affect, autobiographical recall, self-awareness and delusional belief-fixation (see review of right frontal functions in Edwards-Lee and Saul 1999). Thus, it is clear that the frontal lobes must be critically involved in fundamental aspects of religious cognition.

IMPLICATIONS FOR A THEORY OF RELIGION

We have now established the links between fundamental cognitive components of religion and the frontal lobes. How might this fact inform a theory of religion?

(1) *Motivation to engage in religious practices:* one implication of the role of the frontal lobes in religion is that people engage in religion in order to activate the frontal lobes. I am particularly intrigued by this possibility as it would constitute a testable hypothesis on the motivational basis for religion. The hypothesis assumes that people have some extremely pressing reason to activate the frontal lobes and that religion is an effective means of doing so. Why would people want to activate and develop frontal networks? Frontal activation is a

prerequisite for development of various ECF-related functions that are crucial for personal autonomy including self-awareness, moral insight, and intellectual creativity (Lhermitte 1986). Pro-social behavior, including the ability to produce behaviors appropriate to the social context, depends on frontal functions. Empathy, fellow feeling, and compassionate sympathy appear to depend crucially on frontal activation. The list could go on but I think it is reasonable to conclude from the foregoing review that the frontal lobes appear to mediate those capacities and functions that uniquely define us as mature and free human persons and thus frontal activation and development is a desirable outcome.

It is not surprising then that human cultures throughout the world and throughout history have developed practices and educational systems that promote development of the frontal lobes: there is no other way to develop a fully responsible and capable human being. Among these cultural practices the techniques of choice have been religious practices. Every human culture has developed "religious" systems and a range of religious practices. The functions of these systems are undoubtedly multiple. But among these functions, I suggest, is the activation and development of frontal networks.

Is there any evidence that religious practices actually do activate frontal networks? The evidence is sparse and mostly circumstantial because no one has actually tried to study effects of religious practices on frontal activation patterns. Nevertheless, there is some suggestive data: d'Aquili and Newberg (1993) reviewed a number of studies that apparently established a link between sustained attention associated with the practice of meditation and EEG (electroencephalography) theta waves above the prefrontal cortex. The EEG data therefore suggest that sustained meditation results in activation of prefrontal networks. Newberg *et al.* (1997) later confirmed these EEG data using SPECT (single-photon emission computed tomography) imaging techniques. Regional cerebral blood flow changes were studied in six highly experienced meditators while they meditated. Results demonstrated significantly increased blood flow to the inferior frontal and dorsolateral prefrontal cortical regions while subjects engaged in "intense meditation." In a review of the literature on mental effects of prayer Worthington, Kurusu, McCullough, and Sandage (1996) summarized a number of studies relevant to the issue of effects of religious practices on mental functions

associated with the frontal lobes. Use of prayer, for example, was correlated with indices of hope and with subjective well-being at least in religiously committed subjects. Prayer appeared to be a very common coping method for persons in distress whether they described themselves as religious or not.

Perhaps the most obvious objection to the hypothesis I have discussed here is that there are persons who do not engage in religious practices and yet whose frontal lobes seem to be functioning satisfactorily. I have no doubt that that is true. I do not claim that religious practices are the only methods available to us to stimulate development of the frontal lobes. I do believe however that use of religious practices is the traditional method.

(2) *Criteria for selecting among theories of religion:* a second implication of the link between religious cognition and the frontal lobes is that any theory of the psychology of religion will have to include the frontal lobes or at least be compatible with a role for the frontal lobes. Certainly the theories discussed in this volume are compatible with frontal involvement.

(3) *Explanation for religion's physiologic effects:* bringing the frontal lobes into the scientific discussion of religion gives us an extra tool with which to explain religious phenomena and effects of religion on experience. For example, there is some evidence that prayer and religiosity are associated with better health in certain elderly persons (Ellison *et al.* 1989; Idler 1987; Kune *et al.* 1993; Levin and Vanderpool 1989). It may be that beneficial effects of religion on health are mediated by the frontal lobes. A vast amount of neuropsychological data support the view that frontal neural networks mediate the psychological functions (e.g., optimism and hope, sense of efficacy and resilience, sense of agency and perseverence, and so on) that have been postulated to be crucial mediators of religion's effects on health (Dull and Skokan 1995; Idler 1987; Starkstein and Robinson 1991). In addition, anatomical connectivity patterns of the frontal lobes suggest that the frontal lobes directly regulate internal physiologic control systems such as the autonomic nervous system and hypothalamic and limbic sites (Cechetto and Saper 1990) that are known to directly impact health status. There are direct inhibitory projections from orbitofrontal sites onto hypothalamic and brainstem regulatory nuclei, for example (Goldman-Rakic 1987; Nauta 1971; Porrino *et al.* 1981) and stimulation of orbitofrontal cortex immediately elicits a variety of autonomic responses such as changes

in heart rate, blood pressure, and hormonal release (reviewed in Damasio *et al.* 1991a and b).

(4) *Evolutionary origins of religion:* clues about the origins of religion can be gathered by studying the evolution of the frontal lobes and associated functions such as Theory of Mind (ToM). One possibility for example is that religion could not have evolved before development of Theory of Mind (ToM) abilities.

With some irony Rabbit (1997, 2) pointed to the congruence between recent concepts of executive cognitive functioning of the frontal lobes with formal theological criteria for commission of a serious sin:

> The minimal functional processes involved in the commission of a mortal sin (taking the Roman Catholic framework) are awareness of the self as the intending perpetrator of the act; recognition of the unpleasant implications of the act for others by possession of a Theory of Mind (ToM); recognition of its moral repulsiveness by possession of a Theory of the Mind (ToM) of God; an ability to simultaneously represent alternative acts and their possible outcomes in working memory in order efficiently to choose between them; conscious formulation of a well-articulated plan to perform the act successfully; self-initiation and execution of sequences of appropriate actions to consummate this plan during which recognition of personal culpability is maintained by continuous self-monitoring; recognition of attainment of the goal state and an intention to use what has been learned in its pursuit to perform it again if opportunity occurs. Clearly only the central executive can sin.

I would only add that the homuncular "central executive" can do nothing without the frontal lobes.

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CHAPTER 11

Conclusion: religion in the flesh: forging new methodologies for the study of religion

Jensine Andresen

My title, which obviously tips its hat to Lakoff and Johnson's (1999) excellent retooling of philosophical methodology, underscores the importance of staying current with research in many fields as we continue to search for new ways to understand religion. Interdisciplinary collaborations of the past decade or so have demonstrated that methodologies from one single discipline often fail to capture the conceptual and lived nuances of complex phenomena. We therefore must remain flexible and fluid, adopting more rigorous forms of empirical study and staying attuned to more detailed expositions of phenomenological realities. Cross-cultural, ethnographic data raise the importance of individuals' interpretations of their symbolic, religious worlds within the complex contexts of communities and larger social groups. This research likewise suggests an underlying human commonality in the types of religious worlds represented, and in the mode of representation, both of which belie the dependence of religious states and processes upon the human brain.

Frake's (1997, 33) description of methodology as "theoretically motivated notions of *what to do* when faced with the real world" is appropriate methodology links data, i.e., what we construe to be observations of some particular reality, to theory, i.e., our proposals for understanding reality in general. But because academic fields often are defined by a set of problems and a range of research methods (Beit-Hallahmi and Argyle 1997, 5), multidisciplinary endeavors always raise the question of just whose method will be used. Our burgeoning cognitive science of religion must prove competent in linking data, methods, and theories across disciplines, including those that address the propagation of mental representations; various theories of mind; proposals concerning the neural correlates of human experience; and data on the psychology and biochemistry of such experience.

Although individuals representing a broad range of disciplinary specializations have formulated a wide range of proposals for the interdisciplinary interchange between cognitive science and the study of religion, scholars interested in the topic often write in different journals not known to or read by one another. As a result, distinct lineages of scholarship have begun to arise. Reading broadly, one immediately is struck by the extent to which the literatures cited by the various authors are mutually exclusive. Surveying the literature in cognitive science and religion is akin to crafting a frame from an array of diverse building materials. The result is not always pretty, but it is a necessary first step in a "conceptual integration" (Cosmides *et al.* 1992, 4) between the natural science, behavioral, social science, philosophical, and historical disciplines that contribute to our inquiry.

Some of the existing work in cognitive science and religion echoes Henry Nelson Wieman's (1926, 23) early twentieth-century view that science is necessary to confirm the knowledge of God. Seventy-five years later, Sir John Templeton, who similarly desires to use science to find evidence of God, supports various initiatives through the John Templeton Foundation (JTF) to examine the interface of cognitive science and religion. For example, the Foundation provided funding for the international conference that spawned this volume and also for a program at the National Press Club in Washington, D.C., in September of 1998, entitled "Neuroscience and the Human Spirit: Meeting the Challenges of Contemporary Brain Research." Frederick K. Goodwin, former Director of the National Institute of Mental Health and present Director of the Program on Medical Science and Society, opened the meeting, which also was sponsored by the Ethics and Public Policy Center's Program on Medical Science and Society. Goodwin asked whether advances in the brain sciences leave any room for free will, and he argued forcefully that we should not replace the view of human beings as moral agents with a view that sees human beings held under the sway of biology and environment.

"God and Computers: Minds, Machines, and Metaphysics" lecture series at the Media Laboratory at MIT, was organized by Anne Foerst. During this series, Brian Cantwell Smith (1998), Professor of Cognitive Science and Computer Science and Adjunct Professor of Philosophy at Indiana University, discussed the impact of the emergence of the "intentional sciences" of logic, cognitive

science, psychology, neuroscience, and elements of biology, on changing conceptions of reality. Because these sciences ask questions of ultimate significance, including "What is it to be human?," which traditionally have been the domain of religions, Smith reflected on whether or not scientists can give people's lives sufficient meaning and inspiration, perhaps even instilling grace and redemption. Another speaker in the series, Joel Moses (1998), Professor of Computer Science and Engineering at MIT, examined the layered religious hierarchy of the Jewish state as defined in the Pentateuch, claiming that such a hierarchy may have a place in the contemporary fields of artificial intelligence and computer science. Alex Pentland (1998), Academic Head of the MIT Media Lab, discussed. Quaker teachings that the way to an enlightened life is through introspection of one's "inner light" and consultation with one's surrounding community in the context of the Media Lab computer systems. Francisco Varela (1998) also spoke at the MIT series, and the "fleshed out" version of his presentation for that program comprises his chapter in this volume. Addressing the audience as a Buddhist and neuroscientist who sees spirituality as an open quest for meaning, Varela stressed the need to build an active research project around the theme of "neurophenomenology," which bridges phenomenological and neurobiological minds, i.e., the "mind mind gap." Although much has been published about the gap between the neuro-computational (or third-person) mind and the experiential (or first-person) mind, Varela argued that there exist natural passages between these two levels of phenomena.

NEUROBIOLOGICAL THEORIES OF RELIGION

Members of committed religious communities approach the interface with cognitive science cautiously, by examining the impact of neurological research on classical religious experience, e.g., Paul's reflections in I and II Corinthians (Walaskay 1989). Others formulate neurobiological theories of religion that refer to the neural correlates of this experience, e.g., d'Aquili and Newberg's (1993a, 1998a and b) neuropsychological model of religious experience (also see d'Aquili and Newberg 1993b for a discussion of ritual trance). d'Aquili and Newberg co-founded the Institute for the Scientific Study of Meditation d'Aquili was an Associate Professor of Psychiatry at the University of Pennsylvania until his death in August of 1998, and

Newberg currently is a Clinical Assistant Professor in the Division of Nuclear Medicine, Department of Radiology, and an Instructor in the Department of Psychiatry, at the University of Pennsylvania. Before his work with Newberg, d'Aquili collaborated with other scholars in the formulation of theories relating to "biogenetic structuralism" and "cognitive operators" (d'Aquili 1972, 1978, 1986; Laughlin, Jr. and d'Aquili 1974; d'Aquili and Laughlin, Jr. 1975; d'Aquili *et al.* 1979; Laughlin, Jr. *et al.* 1992 [1990]).

In attempting to explain the neural expression of religious experiences, d'Aquili and Newberg (1993a) argue that four tertiary association areas in the brain may be involved in various mystical states. These include the inferior temporal lobe (ITL), which scans the visual field and alerts the organism to objects of interest; the inferior parietal lobule (IPL), which generates abstract concepts and relates them to words; the posterior superior parietal lobule (PSPL), which is involved in the analysis and integration of higher-order visual, auditory, and somaesthetic information; and the prefrontal cortex (PC), the entire frontal tertiary complex of the brain, which is the only area that receives afferent fibers from all sensory modes and is involved in mediating concepts via its interconnections with the IPL. These same areas, they claim, are implicated in the sense of the divine and the subjective experience of God. According to d'Aquili and Newberg's model, the hyperstimulation of either the ergotropic or trophotropic systems leads to "deafferentation" of the PSPL (see d'Aquili and Newberg 1999). According to d'Aquili and Newberg (1993a, 189), deafferentation of the left PSPL is associated with the dissolution of self other boundaries, while deafferentation of the right PSPL is associated with the subjective sensation of spaciousness. The right PSPL plays an important role in generalized localization and the sense of spatial coordinates *per se*, whereas the left PSPL exerts influence with regard to objects that may be grasped and manipulated. (According to d'Aquili and Laughlin, Jr. 1975, the ergotropic system includes the sympathetic nervous system, which governs arousal states and fight or flight responses, while the trophotropic system includes the parasympathetic peripheral nervous system, which governs basic vegetative and homeostatic functions. The authors believe that alteration in tuning of these systems from the peripheral autonomic level to the cerebral level accounts for altered states of consciousness.)

Also employing an ergotropic/trophotropic model, Roland

Fischer (1969, 1971, 1972, 1975, 1978, 1986) suggests that ecstatic and meditative states can be placed on a circular continuum representing varying states of subcortical arousal. In brief, Fischer claims that movement in one direction reflects ergotropic arousal, while movement in the other direction indicates trophotropic arousal (see Wulff 1997, 110–112). Similarly Laughlin, Jr. *et al.* (1993) use an ergotropic/trophotropic tuning model to discuss "mature contemplation."

Following the biogenetic structural approach, Lex (1979) utilizes Hess' (1925) model of the complementary interaction between an energy-expanding or ergotropic system and an energy-conserving or trophotropic system to argue that under controlled, i.e., institutionalized, conditions, religious ritual trance produces a readjustment of dysphasic biological and social rhythms by manipulating neurophysiological structures. Lex (1978) analyzes "revitalization movements," which involve individual leaders or "prophets" who inspire new moral and social orders by their revelations (also see Walter and Walter 1949; Gellhorn 1967). In attempting to explain why human ceremonial ritual inevitably is embedded within a mythic structure, d'Aquili and Laughlin, Jr. (1979, 153) argue that the rhythmic quality of ritual produces positive limbic discharges resulting in decreased distancing and greater social cohesion. They also claim (d'Aquili and Laughlin, Jr. 1979, 159) that ritual performed by adult members of the group has the secondary effect of socializing the young (see Goodman 1983 for a review).

The notions of "cognitive subsystems" and "cognitive operators" also have been used in the cognitive exploration of religious experience. For example, the model proposed by Teasdale and Barnard (1993) at the level of cognitive processes distinguishes nine "Interacting Cognitive Subsystems" based upon data from the psychology of language. The authors believe that two of these nine, the "Implicational System" (which relates things to one another, looks for patterns, establishes meaning, traffics in the abstract, and is responsible for the manifestation of religious meanings) and the "Propositional System" (which makes statements about belief) are important for religious thought. Somewhat similarly, d'Aquili (1978, 1986, 147–151) postulates that at least six core cognitive operators (defined as all the possible primary, logical, or affective relationships that obtain between elements comprising a single semantic domain) within the brain operate upon sensory input and organize it in specific ways to produce cognitive structures such as myth themes.

d'Aquili (1978, 1986) claims that the "holistic operator" is responsible for rare states of "AUB" (Absolute Unitary Being), defined as general, transcendent religious experiences, and that the "binary operator," correlated with the inferior parietal lobe, permits meaning to be extracted by ordering abstract elements into dyads involving varying degrees of polarity so that each pole of the dyad derives meaning by means of contrast with the other pole. d'Aquili and Newberg (1999) also discuss cognitive operators in some depth, claiming they are important to the neuropsychology of the "mystical mind."

Newberg and d'Aquili (2000) represents the most recent iteration of a neuropsychological account of religious and spiritual experience. The paper differentiates two major routes towards attaining such experiences, "group ritual" and "individual contemplation or meditation." It argues that these two categories of practice are similar in kind along two dimensions, namely in including intermittent emotional discharges involving subjective sensations of awe, peace, tranquility, or ecstasy; and inasmuch as varying degrees of unitary experience correlate with these emotional discharges. The model also references particular functions by which the brain interprets sensory input and thoughts. In this paper, the authors are careful to clarify that "these operators do not exist in the literal sense, but [they] can be useful when considering overall integrated function of certain structures in the brain." The authors claim that the "causal operator" is particularly important for religious and spiritual experiences, and that it derives its function from the inferior parietal lobule in the left hemisphere, the anterior convexity of the frontal lobes primarily in the left hemisphere, and their reciprocal neural interconnections. The authors believe this operator accounts for the causal ordering of elements of reality abstracted from sense perceptions, inasmuch as "when no observational or 'scientific' causal explanation is forthcoming for a strip of reality, gods, powers, spirits, or some other causative construct is automatically generated by the causal operator." They also believe that the "holistic operator," localized to the posterior superior parietal lobule and adjacent areas in the non-dominant hemisphere, is significant for religious experience, since it permits reality to be viewed as a gestalt.

To explain particular types of religious experience, Newberg and d'Aquili (2000) return to the notion of "deafferentation," the ability of certain brain structures to block input into other structures. When

a brain structure that ordinarily processes input has been deafferented to a significant degree, it will extract meaning from its own random neural activity, they claim. For example, a deafferented area of the brain that ordinarily analyzes visual input will tend to interpret neural activity as visual input, thereby resulting in a visual hallucination. Finally, the authors attempt to show that a variety of spiritual experiences representative of the two groups described above ("group ritual" and "individual contemplation or meditation") lie along the same continuum.

Starting with ritual, Newberg and d'Aquili (2000) mention prior speculation that rhythmicity in the environment drives either the ergotropic or trophotropic system to maximal capacity, sometimes resulting in spillover and activation of the other system. The authors contend that this scenario causes certain sections of the right PSPL to undergo progressive deafferentation, which increases the individual's subjective sense of wholeness. In contrast, they claim that meditation "approaches the situation from the opposite direction," utilizing a "top-down" mechanism that uses cognitive/emotional activity to drive the ergotropic and trophotropic systems to maximum activation.

Reiterating prior work (d'Aquili and Newberg 1993a and b), Newberg and d'Aquili (2000) claim that during meditation, beginning when the subject wills or intends to focus either on a mental image or on an external object, activation of the right PFC (prefrontal cortex) activates the right PSPL via the thalamus, which functions as a relay. The object, presented by the ITL, is oriented by the PSPL, and a relative increase in stimulation between the right PFC, the ITL, and the PSPL exists. Continuous fixation on the object stimulates the right hippocampus, which stimulates the right amygdala, resulting in a stimulation of the lateral portions of the hypothalamus. Impulses then pass back to the right amygdala and hippocampus, increasing in intensity as they travel. The nerve impulses feed back to the right PFC, reinforcing the system with progressively intense concentration upon the object, and, thus, a reverberating loop is established. The circuit continues to reverberate and to increase in intensity until the stimulation of the hypothalamic ergotropic centers spill over to the hypothalamic trophotropic centers, resulting in the maximal stimulation of the left PFC, with total blocking of input into the left PSPL. According to the authors, this state may be associated with the obliteration of the

self other dichotomy, which would explain the subjective sensation of becoming one with the object of meditation. The authors also cite evidence from Joseph (1990) that the self other dichotomy is a left PSPL function that evolved from the more primitive division of space into the graspable and the non-graspable. They also claim that maximal stimulation of the ergotropic and trophotropic systems with total blocking of input into both the right and left PSPL results in the experience of "Absolute Unitary Being" (AUB), which, earlier in the paper, the authors describe as an abolition of discrete boundaries. To further link the phenomena of ritual and meditation, the authors claim that both practices can result in simultaneous activation of the ergotropic and trophotropic systems with concomitant deafferentation of the left and right PSPL, resulting in bliss, ecstasy, and profound unitary states.

In general, Newberg and d'Aquili (2000) contend that unitary states are important to a continuum of spiritual experience, and they repeat an assertion made by d'Aquili (1986), who claims that understanding the phenomenology of subjective religious experience requires acknowledging a greater sense of unity relative to one's ordinary perception of unity in daily life. They also propose a continuum of activation of the holistic operator, from slight/moderate transcendence (e.g., the experience of listening to a piece of music) to romantic love, through numinosity or religious awe, to Bucke's (1961) Cosmic Consciousness, and, finally, to the state of AUB, which they believe is a state of ultimate unity described in the literatures of all major world religions.

Newberg and d'Aquili certainly can be commended for devising a comprehensive and creative synthesis of substantial research, both from the phenomenology of religion and also from brain science. Nevertheless, I raise here a number of caveats with respect to their theory. First, the two phenomenological categories outlined by the authors, "group ritual" and "individual contemplation or meditation," are vague. Commencement ceremonies certainly fit the bill of "group ritual," but one hardly can maintain that such enactments occupy a pole opposite dark retreats in which Tibetan Buddhist meditators enter solitary meditation for upwards of fifty-five days! The category of "individual contemplation or meditation" is particularly troubling. In the Indo-Tibetan tradition of Buddhist meditation alone, one finds many thousands of different meditative sequences, each specified both in terms of the route to be traversed

by the initiate and also in terms of the preferred outcome or goal. Sectarian wars have been waged in Tibet for more than a millennium over the correct interpretation of complex sequences of meditative instructions and also over the correct description of experiential outcomes. An ethnographic error of some magnitude therefore occurs when one unreflexively subsumes a diversity of such practices under a simple Western label, "meditation" (Andresen 2000).

Furthermore, work by researchers such as Atran (1994) and Pinker (1994) on cognitive modules, juxtaposed against comments by d'Aquili and Newberg on "cognitive operators," represents a prime example of research emanating out of disciplinary, social, and academic environments so insulated that the authors, at least judging from their bibliographies, appear unaware of each other's work. This is somewhat understandable in the case of d'Aquili's earlier work (1972, 1978, 1982, 1986), since the notion of modularity was still being developed. But we cannot make this same exception for d'Aquili's and Newberg's (1993a, 1998a and b, 1999), and Newberg and d'Aquili's (2000) work, which mentions so-called cognitive operators in the context of a neuropyschological model of religious experience. One minimally needs to examine how such "cognitive operators" compare or not with cognitive modules. Even with this kind of analysis, the postulation of "cognitive operators" in the brain is bound to mislead people into thinking that such entities actually exist in the conventional sense of the term, despite disclaimers to the contrary. Watts (1999, 335) rightly notes that, "In introducing the terms 'causal operator' and 'holistic operator,' we already encounter one of the problems with d'Aquili's approach, namely, that these are not generally accepted terms in neuroscience." As Watts (1999, 336) comments, "One problem is that religious experience is so diverse that it may indeed be inappropriate to look for a single neural theory of such diverse phenomena."

In addition, Newberg and d'Aquili appear to be explaining a phenomenon that they themselves have created. I refer here to the so-called state of Absolute Unitary Being (AUB), a pesky creation of d'Aquili (1982) later referenced by d'Aquili and Newberg (1993a and b; Newberg and d'Aquili 2000). First, the continuum that the authors propose from the slight/moderate transcendence of aesthetic enjoyments to the "ultimate unity" of AUB, is, on ethnographic grounds, completely speculative. Unless one wishes to focus exclu-

sively on Theosophist interpretations, Buddhism certainly offers counter-evidence to the statement that AUB, a so-called state of ultimate unity, is described in the mystical texts of all the world's major religions. Indeed, when they proposed the notion of *śūnyatā*, or "emptiness," Buddhists were reacting against this kind of unifying phenomenology in Hinduism, e.g., the union of *Brahma* and *Ātman*. Descriptions of *śūnyatā* are exceedingly nuanced and complex, all the more so in terms of Sanskrit and later Tibetan, Chinese, and Japanese linguistic categories; the term hardly deserves being lumped into the category "AUB." Furthermore, perhaps the most troubling aspect of the model proposed by Newberg and d'Aquili is the paucity of experimental data offered to support it. If it were deafferented, it is possible that the IPL could produce various states of awareness, but until the model is tested in the laboratory, this idea remains somewhat mystical itself.

d'Aquili and Newberg do encourage readers to examine religion in terms of neuropsychology, for which they should be commended, and many of their comments on the neurobiological basis of religious experience serve as impressive attempts to come to grips with the protean nature of religious phenomena. Nevertheless, their theory remains limited by the unconstrained nature of the speculations they advance. It also bears the traces of deductive reasoning, beginning with broad suppositions of the genre "Religious experience = *x*, so how does the brain support something like *x*?" A more productive approach, indeed the approach adopted by the authors in this volume, describes empirically a specific religious behavior such as the attribution of agency or Mind, belief fixation, or certain ritual behaviors, and then asks, "How might the brain support various components/processes of the religious behavior we have just analyzed and described?" Replacing deduction with empirical reasoning of an inductive nature, this latter approach calls for the slow and painstaking accumulation of data, yielding results that are cumulative and, generally, trustworthy (McNamara 1999).

Many other studies also exist at the boundary of cognitive science and religion. Researchers have examined the relationship between cognitive complexity and religious affiliation, and Hunsberger *et al.* (1992), for example, report on two studies assessing the proclivity of individuals to increase the integrative complexity of social, moral, or religious thinking when prompted. The authors find that in both studies, religious orientation was not a significant predictor of

integrative complexity. Hunsberger *et al.* (1993) claim that the extent to which people report religious doubt is positively related to the integrative complexity of their thinking about both their own and others' doubts. They also claim that there is a weak tendency for high religious doubters to think more complexly about a general religious issue, but not about nonreligious issues, suggesting that the relationship between extent of religious doubt and complexity of thought tends to be domain specific. Altemeyer and Hunsberger (1992) contend that religious fundamentalism and nonquesting are linked with authoritarianism and prejudice towards minority groups, and Hunsberger *et al.* (1996) demonstrate that people low on the measure of fundamentalism are more open, complex, and critical when they process information relating to religion. In addition, Hunsberger *et al.* (1994) discuss cognitive complexity as it relates to existential thought, finding that for those who score more highly on fundamentalism, complexity of reasoning becomes simplified when subjects address existential issues.

Meditation practice also has been a popular target of cognitive science research (see Shear and Jevning 1999; Andresen 2000), which has employed EEG (electroencephalography) studies (Das and Gastaut 1955; Banquet 1972; Benson *et al.* 1990; Jacobs *et al.* 1996; Kjaer *et al.* 1997), SPECT (single-photon computed tomography) imaging (Newberg *et al.* 1997), and PET (position emission tomography) imaging (Herzog *et al.* 1990 1991; Austin 1998) to probe into the mechanisms whereby this ancient introspective technique is able to induce alterations in states of awareness. We also find Jonte-Pace's (1998) examination of Brown and Engler's (1980) Rorschach study of Buddhist meditators, in which the impersonal style of response was seen to be consistent with Buddhist doctrines of no-self. Jonte-Pace herself reports that the Rorschach records reveal a cluster in which so-called master's records share high shading responsivity, high amorphous form responsivity, and high inanimate movement responsivity, all of which are typically indicators of psychopathology. Nevertheless, the original researchers for the study, Brown and Engler, perhaps betraying their own personal interest in the Buddhist tradition, interpret the vague and slippery determinant cluster result positively, as indicating that the so-called masters have achieved a specific level of meditative progress referred to as "access samadhi."

RELIGION AND THE TEMPORAL LOBES

Many cognitive studies of religion focus on the role of the temporal lobes of the brain. Among a population of temporal lobe psychotics, for example, Slater and Beard (1963) report a dominance of religious ideation or God-experience themes, often embedded within multiple conversions. Dewhurst and Beard (1970) also report a high degree of religiosity among temporal lobe epileptics eight patients had been involved with religion before their illness, twenty-six were interested in religion afterwards, and six experienced a conversion. Bear and Fedio (1977) report that temporal lobe patients are prone to religiosity, viscosity (perseveration), circumstantiality (interpreting mundane events with great personal significance), hypergraphia, a sense of important personal destiny, and exotic philosophical and mystical ideas dominated by nascent themes (also see Bear 1979a and b). Similarly, Bear *et al.* (1982) claim a distinctive behavioral profile for temporal lobe epileptics that includes the desire for social affiliation, circumstantiality, religious and philosophic interests, and deepened affect. And Fedio (1986) delineates the most commonly cited interrictal behavioral manifestations of temporal lobe epilepsy (TLE) aggression, psychosis, sexual dysfunction, religiosity and philosophic interests, hypergraphia, circumstantiality, and pedantic speech. Additionally, based on clinical observations, Geschwind (1983) claims that common behavioral alterations associated with epilepsy include increased interest in philosophy and religion.

Despite the aforementioned studies, Watts (1999, 333) claims that the link between temporal lobe epilepsy and religiosity is tenuous, noting that seizure experiences often carry negative affect, while religious experiences often result in a positive emotional tone. He also describes studies by Tucker *et al.* (1987) and Fenwick (1996) claiming that the link between temporal lobe epilepsy and religiosity cannot be substantiated (Watts 1999, 334). Instead of a "neurological theory of religious experience based entirely on the supposed link with TLE," what Watts would like us to consider is a "multi-component neurological theory in which TLE-like mechanisms are one strand, such as that set out by Wildman and Brothers [1999]."

Deep within the temporal lobe, one finds the amygdaloid-hippocampal structures, which, when stimulated, can produce various mental phenomena (e.g., Penfield and Perot 1963). Halgren *et al.* (1978) survey research in this area, reporting twenty categories of

mental phenomena induced by stimulation of the brain, including perceptions of external movements and *déjà vu* (also see Mark *et al.* 1972). Gloor *et al.* (1982) also claim that experiential phenomena occurring during seizures or evoked by brain stimulation in temporal lobe epileptics include visual or auditory hallucinations or illusions, illusions of familiarity, forced thinking, etc.

Michael Persinger and his colleagues (Persinger 1983, 1984a–c, 1985a–b, 1987a–b, 1988, 1989a–b, 1992a–b, 1993a–f, 1994, 1995a–b, 1996a–b, 1997; Persinger and Fischer 1990; Persinger and Valliant 1985; Cook and Persinger 1997) hypothesize that religious experiences are evoked by transient, electrical microseizures deep within the temporal lobe — so-called temporal lobe transients. Because Persinger has written so copiously on the possible link between temporal lobe transients and religious experience, and because his theories are extremely controversial, we devote the next few paragraphs to an exposition and brief critique of his work.

Although experiential details are affected by context and reinforcement history, Persinger (1983) argues that basic themes in religious experience reflect the inclusion of different amygdaloid-hippocampal structures and adjacent cortices. Whereas unusual electrical coherence allows access to infantile memories of parents (believed to be a source of god expectations), specific stimulation evokes out-of-body experiences, space–time distortions, intense meaningfulness, and dreamy scenes, says Persinger. He also contends that temporal lobe microseizures can be learned as responses to existential trauma because they stimulate powerful intrinsic reward regions and reduce the anxiety related to death. According to Persinger (1984a), religious and god-related experiences have evolved as a species-specific buffer against death anxiety and comprise a portion of the continuum of temporal lobe transients induced by particular phenomena, including personal crisis, anxiety, hypoxia, hypoglycemia, and fatigue. Finally, Persinger (1984c) observes that temporal lobe transients may be learned (or disinhibited) by meditational techniques, while Persinger (1985a) comments that individuals with biochemical or genetic characteristics producing temporal lobe lability are particularly predisposed to religious experiences.

Focusing primarily on discrete ultimacy experiences, which he dubs "God Experiences," but also implicating other forms of religious experience such as extreme quiescence, Persinger (1987b) argues that these experiences exist along a continuum ranging from

"early morning highs" to recurrent bouts of conversion and dominating religiosity. Persinger (1987b, 19) does not believe that the so-called God Experience is synonymous with temporal lobe epilepsy, which is characterized by exaggerated and disorganized forms of brain activity with vast depolarization waves spread across millions of cells. Instead, he believes the God Experience is a normal and more organized pattern of temporal lobe activity with no convulsions and few bizarre behaviors. Small electrical perturbations are experienced in an organized and balanced fashion, and the experiences primarily are pleasurable, with the sublime characteristics of less severe forms of electrical activity. Despite potential subjective benefits to practitioners, Persinger is concerned that religious experiences associated with particular electrical patterns may come under the control of places and people external to the individual, leading to the kind of loss of agency one usually associates with cults.

Persinger himself (1987b, 9 13) attributes the biological capacity for the God Experience to the brain, and while he does not argue that religious experiences are localized in the temporal lobe *per se*, he does believe that they are associated with the evolution of the temporal lobe. Persinger also correlates "the visitor experience," an intense sensation of the presence of a divine or extraterrestrial entity, with functions of deep temporal lobe structures (Persinger 1989a; Tiller and Persinger 1994). In a study of four hundred men and four hundred women, Persinger (1993c) claims that beliefs in paranormal phenomena are correlated with complex partial epileptic-like signs associated with the temporal lobes (also see Persinger 1985b, 1987a b, 1988, 1993c; Persinger and Richards 1994. For another neurocognitive perspective on a paranormal phenomenon, see Newberg and d'Aquili 1994.

Watts (1999, 334) critiques Persinger (1987b), observing that the latter's two sets of questions about seizure experiences and religious experiences overlap so much that it was almost inevitable that Persinger would have found a correlation. Furthermore, while Persinger's work may be suggestive, one should consider that the type of religiosity Persinger observes may be a compensatory response (via the frontal lobes) to the disinhibition or hyperstimulation he describes occurring in the temporal lobes (McNamara 1999). As McNamara states, "Everything we know about the cognitive components of religiosity, e.g., agency, belief, Theory of Mind (ToM),

rituals, addictive attachments to dogma, etc., links religiosity to the frontal lobes, so it is much more accurate to explain religiosity in epileptics as an attempt by the frontal lobes to re-establish control over a disintegrating temporal lobe." Methodological flags also should be raised Wulff (1997, 101 103) cautions that Persinger employs a tactic with a long and problematic history in psychology, namely formulating a neural model of religious experience on the basis of findings from the area of pathology, in this case, upon findings from epilepsy research. Brothers (1998) also critiques Persinger (1996a), stating that his results namely that people who believed in past lives tended to report more somatic sensations and dissociation phenomena after being subjected to magnetic stimulation of the brain than did people who did not have those beliefs are an unremarkable demonstration of the phenomenon of suggestibility. While Brothers concurs with Persinger's hypothesis that the higher incidence of dichotic word-listening errors among students with exotic beliefs arises from noise emanating from structures of the deep temporal lobes, she adds that, because the dichotic listeners and the believers in past lives are non-epileptics, the neural basis of these supposed epileptic-like signs is not known exotic beliefs and epileptic-like subjective phenomena both could be functions of underlying personality traits for which no neural explanation currently exists.

Despite the problems associated with Persinger's studies, many researchers would agree that the temporal lobes do play a role in certain religious experiences (Mandell 1980; Sackeim *et al.* 1982; Smokler and Shevrin 1979). Henry (1986, 64) associates the left temporal lobe with paranoia, humorlessness, conscientiousness, religiosity with intense self-scrutiny, and a sense of powerful forces influencing one's personal destiny, traits that sometimes may explode into amygdala-driven rage and aggressive behavior. By way of contrast, the right temporal lobe manifests emotional arousability, dependence upon others, and transcendent consciousness, says Henry. Research has credited right temporal arousal with inducing insightful empathy while reducing the normal human urge to bond with others, while, right-sided activation researchers associate with detachment from objects of desire, the author contends. In sum, Henry identifies left temporal lobe epileptics with control and with intellectual and moral contemplation, and right temporal lobe epileptics with changes in attachment and affective

drive or behavior. Furthermore, Austin (1998) also associates temporal lobe transients with the type of subjective sensations he experiences while meditating.

V. S. Ramachandran and his team from the Brain and Perception Laboratory at the University of California, San Diego (Ramachandran *et al.* 1997; also see Ramachandran and Blakeslee 1998; Porush 1993) also are intrigued by the observation that patients with temporal lobe seizures, especially those with temporal lobe epilepsy, sometimes claim to experience God and religious ecstasy during seizures and to be intensely religious in general. Ramachandran and his colleagues hypothesized that three possible, non-mutually exclusive explanations account for this finding: (1) odd, inexplicable feelings lead the patient to religious beliefs; (2) a permanent facilitation of connections between IT (inferior temporal lobe) and the amygdala causes the patient to see deep cosmic significance in surrounding events; and (3) dedicated neural machinery in the temporal lobes concerned with religions may have evolved to impose order and stability on society. To test these hypotheses, the team used skin conductance response (SCR) to measure indirectly the strength of connections from IT to the amygdala. Using three populations, temporal lobe epileptics with religious preoccupations, normal "very religious" people, and normal "non-religious" people, they measured SCRs to neutral stimuli and compared them with SCRs to three types of emotional stimuli, religious, violent, and sexual. In the latter two groups, SCRs were maximal to sexual stimuli but rarely selectively high for religious words, whereas temporal lobe epileptics manifested a selective enhancement of SCRs for religious words and icons above the level found in the religious controls. On the basis of this experiment, the team concluded that the neural substrate for religion and belief in God partially may involve circuitry in the temporal lobes (also see Saver and Rabin 1997).

A NEURAL MODEL OF RELIGIOUS EXPERIENCE

Wildman and Brothers (1999) present a multi-component neural model of religious experience, similar to the multi-level cognitive theory that Watts (1999, 337 340) employs to examine how the cognitive processes subserving religious consciousness could evolve. While Watts is interested in furthering the scientific analogy

between religious and emotional experience, Wildman and Brothers' theory utilizes experiential phenomena from clinical cases to illuminate the phenomenology of discrete (as opposed to extended) ultimacy experiences. Drawing on James (1902) and Otto (1950 [1923]), Wildman and Brothers claim that extended ultimacy experiences involve lasting change in behavior, personality, and beliefs, while five elements recur in discrete experiences: (1) sensory alterations, such as seeing the surroundings infused with light, or olfactory and auditory sensations; (2) self-alteration, including the sense of the loss of individual self or merging with the universe; (3) presences, including benevolent angels and harmful demons; (4) cognitive changes, such as a sense of increased awareness or the unreality of the world; and (5) intense emotional affect, such as ecstasy (also see Yamane and Polzer 1994), awe or dread, guilt, safety, or deep calm.

Wildman and Brothers account for discrete religious experiences in two stages. First, they claim that temporal lobe transients may occur spontaneously in normal individuals and, hence, that they may account for certain types of paranormal experiences. The authors believe that discrete religious experiences likely are correlated with low-frequency, neuronal-conduction events occurring in certain structures of the temporal lobes, perhaps spreading to adjacent structures such as the hypothalamus. The amygdala and hippocampus have the lowest threshold for seizure activity, and the high degree of plasticity of these structures means that they are "trainable," i.e., chronic stimulation below that required to produce seizures in experimental animals causes permanent changes that may lead to seizures. This fact may be relevant to initiation, training, or "practice" sequences in religious traditions cross-culturally, which often are intended to induce religious and mystical experiences. Further, the spontaneous occurrence of altered perceptual states in certain individuals may be explained by these individuals' low threshold for aberrant electrical activity.

Wildman and Brothers' also claim that a discrete ultimacy experience involves the attempt to match the unusual experience with the person's total global semantic network, i.e., "global matching." According to the authors, repetitive electrical discharges commonly originating in the amygdala or hippocampus are correlated with complex partial seizures (CPS) in the temporal lobes. Persinger (1987b, 15) also claims that temporal lobe epileptics show

intense and extreme bouts of temporal lobe transients to the point of manifesting CPS behavior; these patients are known to experience terror and incapacitating anxiety, yet at other times feel euphoric and happy, with the enthusiastic sensation of unlimited possibilities.

Writing from a theological standpoint, Wildman and Brothers caution that scholars interested in the neural basis of religious experience are at the mercy of the stage of the development of the field of neuroscience during the period in which they are working. While acknowledging that studies of patients with temporal lobe epilepsy may contribute to our understanding of discrete ultimacy experiences, they argue that explanations based on neural correlates are both partial and conditioned by history. Reflecting upon scientific matters, other theologians have articulated the notion of "nonreductive physicalism," which holds that all mental events have physical realization in the brain yet never will be adequately accounted for by neurophysiological analysis (e.g., Murphy 1998, 1999; Clayton 1999). Furthermore, Watts (1999, 331) advocates "perspectivalism," which involves seeing theological and naturalistic perspectives as different yet complementary.

> As cognitive neuroscience gains increasing understanding of the cognitive and neural processes subserving religious consciousness, it will probably become clear which brain processes are particularly involved in people coming to think in ways that are in tune with God. However, this need not lead us to ask whether religious experience is caused by the brain *or* by God (Watts 1999, 330).

He continues later (Watts 1999, 331), "there are additional *theological* reasons for not asking whether something comes from God *or* has a natural cause. It would involve the mistake of seeing God as one cause in a series of possible causes, and would 'naturalize' and limit God in a way that classical theism has always been careful to avoid" (for more on theological and religious responses to neuroscience, see Peterson n.d.; Ashbrook 1984, 1989; Ashbrook and Albright 1997; Barbour 1998; Holmes 1993; Jeeves 1994; Schmitz-Moormann 1986; Stevens 1986; Watts 1998; Watts and Williams 1988).

Wildman and Brothers (1999) employ significant rigor when discussing neuropsychology, citing known data concerning temporal lobe epilepsy, interictal syndrome, etc. Still, they essentially accept the view that ultimacy experiences are mediated by the temporal lobes, and because they are interested in developing diagnostic

criteria for ultimacy experiences, they confine themselves to using neural data for descriptive purposes only (McNamara 1999). Nevertheless, like d'Aquili and his colleagues, Wildman and Brothers do not consider the role of compensatory activation of inhibitory circuits in the frontal lobes as precursors to ultimacy experiences. For example, Wildman and Brothers claim that sensed presences often are part of ultimacy experiences and that sensed presences result from temporal lobe changes such as temporal lobe transients. But sensed presences also may result from Theory of Mind Mechanisms (ToMMs) that depend crucially on frontal activation. Still, their distinction between short-term and long-term ultimacy experiences is helpful, since long-term ultimacy experiences involving characterological transformations are much more likely to involve the frontal lobes than the temporal lobes. Indeed, it is likely that all ultimacy experiences involve interactions between frontal and temporal circuits, although most authors neglect the role of the frontal lobes. In the future, researchers who believe that the temporal lobes are critical for religion may find themselves surprised when PET activation studies (e.g., Newberg *et al.* 1997) begin to demonstrate frontal activation with prayer and other forms of religious involvement (McNamara 1999).

CLOSING THOUGHTS

Because a cognitive science of religion must rely on empirical observations and data from actual experiments, scholars of religion will do well to familiarize themselves with cognitive science's key orienting concepts and methodologies and to remain abreast of new developments in this rapidly expanding area. Religious texts are memorized, creeds are recited, and icons and *mandalas* are visualized, which means that any theory of how these practices function in religious venues would be naïve were it to bypass the wealth of information emerging from cognitive neuroscience on the manner in which processes such as memory, verbalization, and visualization function at the cognitive level. Gazzaniga (1997), for example, surveys the cognitive neuroscience of attention, perception, memory, language, imagery, mental imagery, and the nature of so-called *qualia*, all of which are central to the "religious" enterprise. Kosslyn (1996) also develops a cognitive science perspective on internal mental imagery, a central feature of many religious traditions

(Andresen 2000). High-tech imaging studies, therefore, are not the only route to illumination. Recent scholarship at the intersection of cognitive science and ethics (e.g., May *et al.* 1996; Rottschaefer 1998; Sober and Wilson 1998) also will benefit an emerging cognitive science of religion, since most religious traditions have long histories of encouraging ethical behavior amongst their adherents. Furthermore, research into the cognitive nature of ethical and moral reasoning, including research on altruism in religious contexts (see Post *et al.* 2001), will only deepen our understanding of this crucial area of human engagement.

Throughout all our theorizing, it will be important to realize that all disciplinary juxtapositions, including that between cognitive science and religion, are constrained by the metaphors upon which the authors rely (Lakoff and Johnson 1999; Mitchell *et al.* 1997). Two simple facts that the body/brain/mind constructs its milieu in symbolic ways, and that we are all creatures beholden to our metaphors and symbols may serve as the points of methodological contact enabling cognitive science to inform cross-cultural studies of religion. In the final analysis, it is only through metaphors and analogical reasoning that we are able to move between different modes and levels of analysis (Calvin 1996, 163), and, hence, to begin to develop insightful cognitive theories of religion.

To proceed, we would do well to review current theories of religion, cognitive and otherwise. One needs to consider carefully the work of theorists such as Sperber, Boyer, Lawson, and McCauley on the cognitive representation of religion and ritual and to determine if there are any good reasons to doubt the validity of their postulates. For example, do these sorts of theories lead to predictions that turn out not to be true? Representational approaches do yield some experimental data and also afford precision on one or two aspects of a multifaceted issue, such as religion; hence, the representational approach is crucial, but it is not the whole story (McNamara 1999).

As we develop the cognitive science of religion, and, thereby, further theories of religion, we need also to revisit classical theories of religion (e.g., Otto 1950 [1923]; Eliade 1959; Durkheim 1912) to determine if any of the propositions raised by these scholars have been overlooked. Previous scholars of religion have considered myth and ritual (e.g., Lévi-Strauss 1971, 1978) and phenomena such as religious experience, mystical experience, and ecstatic experience, all

of which represent different literatures. Other topics of study include liturgical involvement, institutional involvement/group practices/group dynamics, religious warfare, art and iconography, and sacred dance. And, more recently, researchers have focused on belief acquisition and transmission and the internalization and development of god concepts. Indeed, religion is compelling precisely because it includes all of these aspects, plus many more. As we move forward, it also will be important to consider the work of creative thinkers such as Burkert (1996) and Girard (1992) in order to understand how to integrate the biological with the cultural. Indeed, previous theories of religion have emphasized religion's usefulness in modulating violence in early communities, sometimes through sacrifice, while others have emphasized cognitive factors. Marxian perspectives emphasize religion's role in quieting the populace and obfuscating exploitation in class societies. And Bergson (1935 [1932]) and Mumford (1967) link the origins of religion to the need to respond to the rise of consciousness, with religion seen to channel the excess affect arising from awareness of suffering and death. We also should explore further the origins of religion in different cultural contexts, and here, we would do well to revisit the work of Merlin Donald (1991), who describes how mimetic culture led to the growth of religion (McNamara 1999).

Of course, any monolithic "theory of religion" is bound to be partial, at best, since its different facets belief, doctrine, ritual, behavior, experience, etc. all require tailored approaches. We would be wise to start from what we know empirically about the mind and experience, and then to consider how this information, together with data from cognitive science and social science disciplines, may help us understand certain aspects of religion. We also need to consider more seriously how certain aspects of religion may be understood in terms of attachment theory, the psychology of addiction, and the evolution of the brain.

Researchers also may wish to extend Lakoff and Johnson's (1999) work further into the domain of religion in order to identify the experiential and bodily sources of the broad array of metaphors so central to religion. Notions of transcendental reason deserve to be rethought, and it is wise to bolster our experientialist approaches over classical approaches in the philosophy of mind. Any new theories of religion should be situated within the frameworks of anthropology and evolutionary psychology, and they can be en-

fleshed with the latest work in neuropsychology together with empirical data about religion's effects on health and other variables. In their discussion of ethics, May *et al.* (1996) also describe useful approaches that could be restyled to fit the case of religion.

I conclude by heralding the overwhelming concatenation of options available to us in this new era of cognitive science as we begin to probe more deeply into one of humankind's most ubiquitous, enduring, and aesthetic manifestations religion.

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